



WINTER 2022

The Bent

Of Tau Beta Pi

THE ENGINEERING HONOR SOCIETY



Engineering & Creativity: Music
Why Do We Call It A... Curie?

ALUMNI CHAPTERS

79 ALUMNI CHAPTERS
47 ACTIVE

Inactive chapters shown in **BLUE**

DISTRICT 1

Central CT, Hartford
Greater Boston Area, MA

DISTRICT 2

Buffalo, NY
Central Jersey, NJ
LI Suburban, NY
Newark, NJ
New York City, NY
New York Capital District, NY
Rochester, NY
Southern Tier, Binghamton, NY

DISTRICT 3

Lehigh Valley, Bethlehem, PA
Philadelphia, PA
Pittsburgh, PA
Wilmington, DE

DISTRICT 4

Baltimore, MD
Hampton Roads, Newport News, VA
Kanawha Valley, Charleston, WV
Research Triangle, Durham-Chapel Hill-Raleigh, NC
Richmond, VA
Washington, DC

DISTRICT 5

Atlanta, GA
Central FL, Orlando
Daytona Beach, FL
Gainesville, FL
Miami, FL
Midlands, Columbia, SC
Palm Beach/Broward, FL
Piedmont, Clemson, SC
Puerto Rico
Tampa Bay, FL

DISTRICT 6

Bluegrass, Lexington-Frankfort, KY
Central Alabama, Birmingham
Great Smoky Mountains, Knoxville-Oak Ridge, TN
Greater Gulf Coast, Mobile, AL
Louisville, KY
Mid-South, Memphis, TN
Rocket City, Huntsville, AL

DISTRICT 7

Ann Arbor Area, MI
Central MI, Lansing
Cincinnati, OH
Columbus, OH
Dayton, OH
Flint, MI
Ohio's North Coast, Cleveland
SE Michigan, Detroit
West Michigan, Grand Rapids

DISTRICT 8

Chicago Area, IL
Central Illinois, Urbana-Champaign
Indianapolis, IN
Milwaukee Area, WI

DISTRICT 9

Kansas City, KS
Pioneer, OK
Rolla, MO
St. Louis, MO

DISTRICT 10

Central Texas, Austin/San Antonio
North Texas, Dallas-Fort Worth
Greater New Orleans, LA
Texas Gulf Coast, Houston

DISTRICT 11

Ames, IA
Minnesota, Twin Cities, MN

DISTRICT 12

Pikes Peak, CO
Front Range, CO/WY
Salt Lake City, UT
Treasure Valley, Boise, ID

DISTRICT 13

Albuquerque, NM
El Paso, TX
Phoenix, AZ
Sun City, AZ
Tucson, AZ

DISTRICT 14

Columbia River Basin, Richland, WA
Portland, OR
Puget Sound, Seattle, WA

DISTRICT 15

Sacramento Vly, CA
SF Bay Area, CA
SF Peninsula, Palo Alto, CA

DISTRICT 16

Los Angeles, CA
Orange County, CA
Greater San Diego, California
Southern California

COLLEGIATE CHAPTERS

257 COLLEGIATE CHAPTERS
618,536 MEMBERS

6 Inactive chapters shown in **BLUE**

A = ALPHA
B = BETA
Γ = GAMMA

Δ = DELTA
E = EPSILON
Z = ZETA

H = ETA
Θ = THETA
I = IOTA

K = KAPPA
Λ = LAMBDA
M = MU

N = NU
Ξ = XI
O = OMICRON

Π = PI
P = RHO
Σ = SIGMA

T = TAU
Υ = UPSILON
Φ = PHI

X = CHI
Ψ = PSI
Ω = OMEGA

AL ALPHA Auburn University
BETA University of Alabama
GAMMA Univ. of Ala. at Birmingham
DELTA Univ. of Ala. in Huntsville
EPSILON Univ. of South Alabama
AK ALPHA Univ. of Alaska Fairbanks
AZ ALPHA University of Arizona
BETA Arizona State University
GAMMA Northern Arizona University
DELTA Embry-Riddle Univ., Prescott
AR ALPHA University of Arkansas
BETA Univ. of Ark. at Little Rock
CA ALPHA UC Berkeley
BETA Calif. Institute of Technology
GAMMA Stanford University
DELTA University of Southern Calif.
EPSILON UC Los Angeles
ZETA Santa Clara University
ETA San Jose State University
THETA Calif. State Univ., Long Beach
IOTA Calif. State Univ., Los Angeles
KAPPA Calif. State Univ., Northridge
LAMBDA UC Davis
MU Calif. Poly St. Univ., San Luis Obispo
NU Calif. State Poly Univ., Pomona
XI San Diego State University
OMICRON Loyola Marymount Univ.
PI Northrop University (inactive)
RHO California State Univ., Fresno
SIGMA UC Santa Barbara
TAU University of California, Irvine
UPSILON Calif. St. Univ., Sacramento
PHI University of the Pacific
CHI California State Univ., Fullerton
PSI UC San Diego
OMEGA Harvey Mudd College
ALPHA ALPHA Calif. St. Univ., Chico
ALPHA BETA UC Riverside
ALPHA GAMMA San Francisco St. Univ.
ALPHA DELTA UC Santa Cruz
ALPHA EPSILON Univ. of San Diego
CO ALPHA Colorado School of Mines
BETA Univ. of Colorado at Boulder
GAMMA University of Denver
DELTA Colorado State University
EPSILON Univ. of Colorado at Denver
ZETA U.S. Air Force Academy
CT ALPHA Yale University
BETA University of Connecticut
GAMMA University of Hartford
DE ALPHA University of Delaware
DC ALPHA Howard University
BETA Catholic Univ. of America
GAMMA George Washington Univ.
FL ALPHA University of Florida
BETA University of Miami
GAMMA University of South Florida
DELTA University of Central Florida
EPSILON Florida Atlantic University
ZETA Florida Institute of Technology
ETA FL A&M Univ.-FL State Univ.
THETA Florida International Univ.
IOTA Embry-Riddle Aero. Univ.
GA ALPHA Georgia Institute of Technology
BETA Mercer University
GAMMA Georgia Southern Univ.
ID ALPHA University of Idaho
BETA Idaho State University
GAMMA Boise State University
DELTA Brigham Young Univ.-Idaho
IL ALPHA Univ. of IL at Urbana-Champaign
BETA Illinois Institute of Technology
GAMMA Northwestern University
DELTA Bradley University
EPSILON S. Illinois Univ. at Carbondale
ZETA University of Illinois at Chicago
IN ALPHA Purdue University
BETA Rose-Hulman Inst. of Technology
GAMMA University of Notre Dame
DELTA Valparaiso University
EPSILON Trine University
ZETA Indiana Univ.-Purdue Univ. Indpls.
IA ALPHA Iowa State University
BETA University of Iowa
KS ALPHA University of Kansas
BETA Wichita State University

GAMMA Kansas State University
KY ALPHA University of Kentucky
BETA University of Louisville
GAMMA Western Kentucky University
LA ALPHA Louisiana State University
BETA Tulane University
GAMMA Louisiana Tech. University
DELTA Univ. of Louisiana at Lafayette
EPSILON University of New Orleans
ME ALPHA University of Maine
MD ALPHA Johns Hopkins Univ.
BETA University of Maryland
GAMMA U.S. Naval Academy
DELTA Univ. of Maryland Baltimore Co.
EPSILON Morgan State University
MA ALPHA Worcester Polytechnic Inst.
BETA Massachusetts Inst. of Tech.
GAMMA Harvard University (inactive)
DELTA Tufts University
EPSILON Northeastern University
ZETA University of Mass. at Amherst
ETA Boston University
THETA Univ. of Massachusetts Lowell
IOTA Western New England Univ.
MI ALPHA Michigan State University
BETA Michigan Technological Univ.
GAMMA University of Michigan
DELTA University of Detroit Mercy
EPSILON Wayne State University
ZETA Kettering University
ETA Lawrence Technological Univ.
THETA Oakland University
IOTA Univ. of Michigan-Dearborn
KAPPA Western Michigan Univ.
LAMBDA Grand Valley State Univ.
MN ALPHA Univ. of Minnesota-Twin Cities
BETA Univ. of Minnesota, Duluth
MS ALPHA Mississippi State University
BETA University of Mississippi
MO ALPHA Univ. of Missouri-Columbia
BETA Missouri Univ. of Science & Tech.
GAMMA Washington University
DELTA Univ. of Missouri-Kansas City
EPSILON Saint Louis University
MT ALPHA Montana State University
BETA Montana Tech. of the Univ. of MT
NE ALPHA Univ. of Nebraska-Lincoln
NV ALPHA University of Nevada, Reno
BETA Univ. of Nevada, Las Vegas
NH ALPHA Univ. of New Hampshire
BETA Dartmouth College
NJ ALPHA Stevens Institute of Technology
BETA Rutgers University
GAMMA New Jersey Inst. of Tech.
DELTA Princeton University
EPSILON Rowan University
ZETA The College of New Jersey
NM ALPHA New Mexico State University
BETA University of New Mexico
GAMMA NM Inst. of Mining & Tech.
NY ALPHA Columbia University
BETA Syracuse University
GAMMA Rensselaer Polytechnic Inst.
DELTA Cornell University
EPSILON New York Univ. (inactive)
ZETA Brooklyn Polytechnic (inactive)
ETA City College of CUNY
THETA Clarkson University
IOTA Cooper Union School of Eng'g.
KAPPA University of Rochester
LAMBDA Pratt Institute (inactive)
MU Union College
NU SUNY at Buffalo
XI Manhattan College
OMICRON SUNY at Stony Brook
PI Rochester Institute of Tech.
RHO NYU Tandon School of Eng'g.
SIGMA Alfred University
TAU Binghamton University
UPSILON U.S. Military Academy
NC ALPHA North Carolina State Univ.
BETA Univ. of North Carolina (inactive)
GAMMA Duke University
DELTA Univ. of NC at Charlotte
EPSILON NC A&T State University
ZETA East Carolina University

ND ALPHA North Dakota State University
BETA University of North Dakota
OH ALPHA Case Western Reserve Univ.
BETA University of Cincinnati
GAMMA Ohio State University
DELTA Ohio University
EPSILON Cleveland State Univ.
ZETA University of Toledo
ETA Air Force Institute of Tech.
THETA University of Dayton
IOTA Ohio Northern University
KAPPA University of Akron
LAMBDA Youngstown State Univ.
MU Wright State University
NU Cedarville University
XI Miami University
OK ALPHA University of Oklahoma
BETA University of Tulsa
GAMMA Oklahoma State University
OR ALPHA Oregon State University
BETA Portland State University
GAMMA University of Portland
DELTA Oregon Institute of Tech.
PA ALPHA Lehigh University
BETA Pennsylvania State University
GAMMA Carnegie Mellon University
DELTA University of Pennsylvania
EPSILON Lafayette College
ZETA Drexel University
ETA Bucknell University
THETA Villanova University
IOTA Widener University
KAPPA Swarthmore College
LAMBDA University of Pittsburgh
MU Penn State Erie, Behrend College
PR ALPHA University of Puerto Rico
RI ALPHA Brown University
BETA University of Rhode Island
SC ALPHA Clemson University
BETA University of South Carolina
GAMMA The Citadel
SD ALPHA S. Dakota Sch. of Mines & Tech.
BETA South Dakota State University
TN ALPHA University of Tennessee
BETA Vanderbilt University
GAMMA Tennessee Tech. University
DELTA Christian Brothers Univ.
EPSILON University of Memphis
ZETA Univ. of Tenn. at Chattanooga
TX ALPHA University of Texas at Austin
BETA Texas Tech. University
GAMMA Rice University
DELTA Texas A&M University
EPSILON University of Houston
ZETA Lamar University
ETA Univ. of Texas at Arlington
THETA Univ. of Texas at El Paso
IOTA Southern Methodist University
KAPPA Prairie View A&M University
LAMBDA Texas A&M Univ.-Kingsville
MU Univ. of Texas at San Antonio
NU Univ. of Texas Rio Grande Valley
XI University of Texas at Dallas
UT ALPHA University of Utah
BETA Brigham Young University
GAMMA Utah State University
VT ALPHA University of Vermont
BETA Norwich University
VA ALPHA University of Virginia
BETA Virginia Poly. Inst. & State Univ.
GAMMA Old Dominion University
DELTA Virginia Military Institute
EPSILON Virginia Commonwealth Univ.
WA ALPHA University of Washington
BETA Washington State University
GAMMA Seattle University
DELTA Gonzaga University
WV ALPHA West Virginia University
BETA West Virginia Univ. Inst. of Tech.
WI ALPHA Univ. of Wisconsin-Madison
BETA Marquette University
GAMMA Univ. of Wisconsin-Milwaukee
DELTA Milwaukee School of Eng'g.
EPSILON Univ. of Wisconsin-Platteville
WY ALPHA University of Wyoming



The Bent

WINTER 2022

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14 Chapter Project Awards

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14 Congratulations to the collegiate chapters recognized with chapter project awards.



20 Looking ahead to Black History Month, TBPi contributors to engineering at Howard Univ.



38 Georgia Southern was installed as the 257th chapter of Tau Beta Pi.



COVER: Abstract digital equalizer with sound wave pattern. How engineering supports the creative industries and arts. **Artist: Dali Polivka**

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Tau Beta Pi was founded at Lehigh University, South Bethlehem, PA, June 15, 1885, by Edward H. Williams Jr., A.B., A.C., E.M., Sc.D., LL.D. (1849-1933). Key and name registered in U.S. Patent and Trademark Office.

Member, *American Society for Engineering Education*; co-founder *Association of College Honor Societies*; and Affiliate, *American Association for the Advancement of Science*.

VISIT www.tbp.org

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COUNCIL'S CORNER

Mennatoallah M. Youssef, Ph.D., VA Γ '04, TBP 2022 President

FUTURE OF TAU BETA PI— VOLUNTEERING YOUR WAY TO THE TOP!

Hello Tau Bates,
What. A. Year.

The past two years have been a time of change with all of our collegiate and alumni chapters adapting for continued operations with the COVID-19 pandemic. It has also been a difficult time for our members and volunteers in their personal and professional lives. While most of us were hoping for more clarity about the immediate future, what is in store for this upcoming year is still stubbornly uncertain. I know many of us hope that we can get back to our standard operating procedure with Convention and other in-person events.

The year 2022 marks my 20th anniversary as a member of TBP. It also happily coincides with the year that I become president of the Association. This has put me in a unique position to not only reflect upon my past twenty years, but also look to our future.

My first experience with Tau Beta Pi outside my own district was at the annual Convention. I attended the 2004 Orlando, FL, Convention as the voting delegate for the Virginia Gamma Chapter and served on the Convention Site Committee. The first-hand experience I gained on the importance of debate, TBP programs and benefits, and how Tau Beta Pi truly is a student-led organization has empowered me to become a leader. I was amazed by how individuals from around the country came together to debate changes to the Constitution and Bylaws, approve the Association finances, and decide new protocols for the 228 collegiate chapters at that time. The passion of those students and volunteers piqued my interest.

Tau Beta Pi is a worthwhile organization because of the tireless efforts of its volunteers and Headquarters team. Volunteers include not only the Association Officials, directors, and other Association-level positions, but also the efforts of all of the chapter volunteers—chapter advisors, collegiate officers, and alumni chapter officers. Tau Beta Pi could not exist without the dedication of our volunteers who continue to further the mission of our Association.

I met many wonderful people at those first few Conventions. As I continue to volunteer, the connections I have with my fellow volunteers continue to grow. It has been 18 years since my first Convention and volunteers have shaped my TBP experience. As I was researching for this article, I realized that many of the volunteers I met at these Conventions are still active volunteers today and have gone on to lead the Association as the Executive Director Curtis Gomulinski, Director of Development Sherry Jennings-King, and Executive Councillor George Youssef. I started out as a student delegate, I became a fellow volunteer, and now I have the pleasure of working with these individuals as the Association president.

As we look to 2022, and the return of more in-person activities, I hope that you will join me at the annual Convention or a District Conference. The opportunity to collaborate with members across chapters and share **Tau Beta Pi experiences** has always been a driver of enthusiasm within our chapters and volunteers. Together, we will continue to push boundaries and take bold steps to grow our chapters, enhance the skills of our members, and contribute to our communities.

To succeed in this, the organization needs your support. If you cannot donate financially, consider donating your time. There are many ways to participate! Consider joining your local alumni chapter, participating in one of our online workshops or mentorship programs, or even just reaching out to a local collegiate chapter to see how you can help them directly.

There are many opportunities that you have, as a member, to join the TBP volunteer family. I hope in my year of being the president of Tau Beta Pi that I can work with volunteers and staff to continue to promote the advancement of the organization. Our volunteers are the reason that Tau Beta Pi will continue to thrive. I look forward to working with you.

Please feel free to reach out at myoussef@tbp.org to continue the conversation.

.....
MENNA YOUSSEF works as a supervisory patent examiner for the USPTO. She was first elected to the TBP Executive Council in 2016, was re-elected in 2019, and will serve as president in 2022. Her B.S. and M.S. degrees in electrical engineering were earned at Old Dominion University and her Ph.D. is from the University of Dayton.

2022 EXECUTIVE COUNCIL OFFICER DIRECTORY

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YOUR LETTERS

Send letters to media@tbp.org. Text may be edited for length and clarity; not all letters can be published.

California Drought Update

I wonder if it is possible to revisit the article published in the Winter 2016 edition written by Trudy E. Bell titled "Peak Water? Choices Are Tough in California's Epic Drought." I was talking with a co-worker the other day and told them about the article. I hadn't read it in several years, but remembered the seriousness of the article. Rereading it after my discussion brought me to question what has been going on to address these concerns over the intervening years.

Andrew M. Perkins, IN E '83

Powering Our EV Future

I feel I have to point out an error in the article. On page 5, the author states: "recharging an average EV consumes about as much power as the average American household."

According to the U.S. Energy Information Administration, the average residential utility customer consumes 877kWh per month (See the eia.gov FAQs).

Edmunds.com tested the efficiency of 25 different EVs and found a range of 20.8 to 38.2 kWh/100 miles. The best selling Tesla model 3 tested at 25.9 and the second best seller Chevy Bolt came in at 25.7 (See Edmunds.com epa data).

This means using 877kWh, those two cars could go ~3400 miles per month, much higher than the average of 1123 miles driven per month (See fhwa.dot.gov data).

So, to be fair, an EV uses about 1/3 as much power as the average American household.

Thomas L. McKinney, SC A '72

Powering Our EV Future

Most people expect future vehicles to be powered by electricity because of climate change. That may be the case, but there are other possibilities. If we price carbon, the most effective way to stop climate change, the increased price of fossil fuel will lead to changes in vehicle power. One possibility is to use carbon collected from the air and renewable energy available at off-peak times to create fuel that can be stored. That "green" fuel can then be used for vehicles or for electricity generation at peak times. It can also be transported with less loss than electricity.

James A. Martin, Ph.D., WV A '66

Powering Our EV Future

I found the article interesting and informative. The big advantage to EVs is that they reduce carbon emission. Being an engineer, when I am given values in an article, I have to ask — What do they mean?

The article stated that vehicles account for 17 percent of the carbon emission. It further states that EVs have one third to one half that emissions of ICEVs. According to NASA, the Earth's temperature has increased 1 C for 100 ppm increase in CO₂. Using linear theory, an acceptable practice for a small change, a switch to all EVs would decrease carbon emission by 8.5 ppm and temperature by 0.085 C. That seems like a small change in climate compared to the expense of a major change in transportation.

It stated that battery cost is expected to drop to \$70 from \$90/kWh. At \$4/gal gasoline is \$0.12/kWh. This is an advantage for gasoline. The ICEVs are not that inefficient. ICEVs are sized to have a range of 400 mi. It is stated that the charging rate for EVs is 5-6 min/mi of range. Better than an hour at the "pump" is a long time; especially, if your business is transporting material.

The ICEV delivers the energy, via combustion, at the device that drives the wheels. The energy for an EV comes from miles away and goes through a distribution system and several transformations before the electricity gets to the motor that drives the wheels.

The article stated that by 2030, there will be 40 million EVs, 16 percent of the total vehicles, and require 27 terawatt-hours of additional electrical energy. A representative mileage value for an EV is 136 mi/Ge. The energy in a gallon of gasoline is 33.7 kWh/gal. Hence, the mileage is 4.04 mi/kWh. For 27 TWh, on average, each EV would drive 2700 mi/year.

It is acceptable for the government to offer tax credits for startup technologies. When there are 40 million EVs on the road, it is hardly a startup. Tax credits of \$7,500 or more will be removed. Also, the tax on gasoline is for maintaining and building roads. It is a use tax. The EVs will have to pay for their share of the road use tax. These are two factors that will increase the cost of EVs.

Letters continue on page 43.

FROM THE EDITORS

Dylan Lane and Patricia McDaniel

2021 CONVENTION POSTPONED

The TBP Executive Council made the difficult decision to officially postpone the 2021 in-person Convention in Knoxville, TN, October 21-23, due to rising concerns about COVID-19. This action was not taken lightly given the inconvenience to those planning to attend and the costs involved. Several virtual events were still held, including the Recruiting Fair (see page 13), plus Engineering Futures, and ICE Sessions. Many of the next steps have been determined, but some are still incomplete, such as when and where the 2022 and 2023 Conventions will be held. Updates and answers to FAQs, will continue to be posted to the website at:

www.tbp.org/conv/2021/conv.cfm

Send any Convention questions to convention@tbp.org.

The Editorial Staff apologizes for the following error:

In the Fall 2021 issue of Chapter Eternal, on page 46, Joseph E. Padgett, VA A '76, was incorrectly listed as deceased. We apologize for this error and thanks to his former classmate Dudley White, VA A '76, we know that Joseph is alive and well.

Thank you to our readers for helping maintain the accuracy of the magazine. If you find an error or inconsistency, please email dylan@tbp.org or call 865/546-4578.



WHO'S WHO IN TAU BETA PI

Recognizing Tau Bate accomplishments.

Caleb T. Alexander Ph.D.

California Alpha '14

has joined the fifth cohort of Oak Ridge National Laboratory's Innovation Cross-roads program. Sponsored by the U.S. Department of Energy's Advanced Manufacturing Office, the program provides support to science-based startups. He has three ChemE degrees, founded DayLyte Batteries, and his project focuses on sodium ion membrane for high energy, low-cost sodium-air batteries.



Gregory S. Boebinger Ph.D.

Indiana Alpha '80

was elected to membership of the National Academy of Sciences. He is director of the National High Magnetic Field Laboratory and a professor in the department of physics at Florida State University. A Distinguished Science Alumnus of Purdue University, he holds a B.S. degree in electrical engineering and is an AAAS and APS Fellow.



J. Dave Irwin Ph.D.

Alabama Alpha '61

was elected a Fellow of the National Academy of Inventors for his "accomplishments in conducting pioneering research and driving the development of new technologies in the field of electrical and computer engineering." He is professor and department head emeritus of the ECE department at Auburn University and a 2015 inductee into the State of Alabama Engineering Hall of Fame.



Errol B. Arkilic Ph.D.

District of Columbia Gamma '91

has been named chief innovation officer at the University of California, Irvine (UCI) and executive director of UCI Beall Applied Innovation. Serving as co-founder of M34 Capital since 2014, he is a nationally recognized leader in technology transfer and entrepreneurship. He also worked as an instructor at UC Berkeley and as a senior adviser for the NSF Innovation Corps node.



C. Jeffrey Brinker Ph.D.

New Jersey Beta '72

was elected as a new member of the National Academy of Sciences. He is one of two laboratory fellows at Sandia National Laboratories, a distinguished and regent's professor at the University of New Mexico, and a pioneer of sol-gel-science and materials synthesis from soluble molecular precursors. His B.S., M.S., and Ph.D. degrees are in ceramic science from Rutgers University.



Kristala Jones Prather Ph.D.

Massachusetts Beta '94

has devised a metabolite valve tool that turns microbes, at a greater yield, into efficient producers of desired chemicals. Colleagues in her field of bioengineering are calling the valves "a new principle in engineering." She serves as an investigator in the Synthetic Biology Engineering Research Center, funded by the National Science Foundation, and as a professor of chemical engineering & department executive.



Michele Barbato Ph.D., P.E.

California Lambda '05

was elevated to a Fellow of the American Society of Civil Engineers (ASCE) "for his outstanding contributions in research, education, and service in the areas of structural engineering and engineering mechanics..." He is a professor and co-director of the Climate Adaption Research Center at the University of California, Davis, and joined TBI as an eminent engineer in 2021.



Tiffany P. Cunningham J.D.

Delaware Alpha '90

has been appointed as a U.S. judge to the Court of Appeals for the Federal Circuit. She was nominated by President Biden and confirmed by the U.S. Senate. This court deals explicitly with appeals on patent law cases. Previously, she was a patent litigator, partner at Kirkland & Ellis, and earned a B.S. degree in chemical engineering from MIT and a J.D. from Harvard Law School.



Susan G. Margulies Ph.D.

New Jersey Delta '82

was selected to lead the National Science Foundation's Directorate of Engineering. She is the first biomedical engineer to head the directorate and is a renowned scholar in pediatric traumatic brain and lung injury associated with mechanical ventilators. She will step down as chair but remain as a professor after the appointment begins at Georgia Institute of Technology and Emory University.



NEW ASCE DISTINGUISHED MEMBERS

The following four Tau Bates were recognized by the American Society of Civil Engineers in its newest class of Distinguished Members, a status reserved for the most eminent civil engineers in the Society.

Jeffrey R. Riegner P.E.

Delaware Alpha '90

has been named chair of the National Complete Streets Coalition, a consortium of organizations focused on making streets safer and more inclusive. He serves as vice president of consulting firm WRA, leading the organization's active transportation practice, and is a Fellow and International Board member of the Institute of Transportation Engineers. He holds degrees from the University of Delaware and UC Berkeley.



Lilia A. Abron Ph.D., P.E.

District of Columbia Alpha '68

has been honored "for advanced environmental engineering and sustainable design through work in both academia and the private sector." Lilia is founder and president of PEER Consultants, P.C., a 2017 TBII Distinguished Alumna, and former professor at Howard University. She was the first African American woman to receive a Ph.D. in chemical engineering at the University of Iowa.



John D. Hooper Ph.D., S.E.

Washington Gamma '90

has been commended "for his eminence in advancing the seismic design provisions of building codes as well as furthering performance-based seismic design." Currently, John serves as senior principal and director of earthquake engineering at Magnuson Klemencic Associates. A pre-eminent structural earthquake engineer, he was inducted into the Academy of Distinguished Alumni at UC Berkeley, where he earned his master's degree.



Mark E. Schafer Ph.D.

Washington Alpha '86

has been elected president of the IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society. He serves as president-elect, and will assume the presidency for a 2-year term starting January 2022. Following a 35-year career in the medical ultrasound field as an entrepreneur/consultant, he is a research professor at Drexel University and an Acoustical Society of America & American Institute of Ultrasound in Medicine Fellow.



Roberto Ballarini Ph.D., P.E.

New York Eta '80

has been recognized "for advancing fracture mechanics-based design of concrete structures and pioneering of structural and material testing at micrometer and nanometer scales." Robert is a professor and CE department chair at the University of Houston and has received awards for his teaching, including the 2000 John S. Dieckoff Award for distinguished graduate teaching from Case Western Reserve University.



Julio A. Ramirez Ph.D., P.E.

Texas Alpha '83

has been honored "for leadership in worldwide data collection, research, and education to enhance resilience of civil infrastructure and communities against natural hazards." Julio serves as a professor of civil engineering and director of the Natural Hazards Engineering Research Infrastructure Network Coordination Office Center at Purdue University. In 2017, he was inducted into the Purdue Innovator Hall of Fame.



Statement of Ownership, Management & Circulation

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I certify that the statements made above are correct and complete. —Curtis D. Gomulinski, Executive Director



How Does Engineering Bridge into the Traditionally 'Creative' Realm of Music?

BY BRIDGET A. MOORMAN, ARIZONA BETA '85

Part of a Series on How Engineering Supports the Creative Industries and Arts

Introduction

Writing, making, and recording music is considered one of the more creative endeavors or industries as compared to most traditional engineering industries. The technology used in recording music has evolved from trying to capture a 'live music performance' in order to hear that performance repeatedly, to capturing sounds or musicians playing as separate 'data items' and integrating them into a unique expression that is pleasing to the human ear. From an engineering standpoint, the basic functions of signal transduction, processing, integration, and archival involved in music production are the same. However, as with all industries, the advent of the computer and ubiquitous telecommunications have expanded the options available within each of those functional aspects. (See sidebar by Beato, page 9, on the twenty top inventions that changed music).

The aesthetic and subjective property of music being pleasing to hear places music production in the creative realm.

According to Geoff Foster, Grammy Award winning recording engineer and chief engineer at Air Studios in London, UK: "The production of a song is a form of storytelling and recording engineers help in that creative process. As a recording engineer, the task is to facilitate getting a great recording and that means knowing where problems lie in a particular process — it is not just about the gear. Moreover, the engineer needs to understand and prepare a situation where problems don't impede the creative process. This is done by creating an environment where the musician feels safe and willing to make that outpouring of their soul to the performance. The understanding of this human side of the recording process is a significant part of recording engineering; perhaps the most significant."¹

In the sound recording industry, there is a difference in the aim of the recording system from most systems in that from a creative or aesthetic standpoint, the system is an 'artistic' tool allowing distortion of the sound signal at each component adding an auditory desirable and pleasing aspect to the final product. While many times a 'clean' signal may be desired at the aggregation point, beyond that, music can involve significant audio signal manipulation in the final product. The "three basic components of an existing audio signal that can be manipulated are: **frequency** (gain at given frequencies adjusted using an equalizer); **dynamics** (done through signal compression or expansion); and, **time delay** (done through the application of reverberation or the introduction of echo and the subsequent harmonics). A combination of all these three is done in sound processing," said Foster.

Briefly, frequency changes are self-evident, i.e. changing the spectral content of the sound that is captured and controlled through adjusting specific frequencies using an equalizer. Dynamics management refers to compression or expansion of the sound waveforms so that the loudest and softest signals either have less or more difference between them than when they were recorded, creating balance amongst the song's constituent sounds. It also allows certain sounds and sound characteristics to come to the forefront or the background as desired by the creator. Time delay and reverberation (reverb) are used to simulate location based aspects of sound with placement and repeating of echo characteristics and can be done via the electronics or the space used for recording. As an example, "when recording a live orchestra with many instruments (in a large space) versus one instrument (in a small space), the sound recorded is captured along with reflections and colorations to the frequency response caused by interaction with the environment. A sound source far away in a big space will have less high frequency information as that information is lost traveling through the air, yet will have more reflections recorded at a comparable amplitude," said Foster.

The figure on page 6 depicts the way in which a sound signal can travel through the different aspects of music/recording production. The musician is in a room playing an instrument emitting a sound wave which is detected or picked up by a sound transducer (microphone). That signal is then amplified and captured on tape and/or a Digital Audio Workstation (DAW) for further processing and integration. The final 'music product' is then archived onto a media which can be played at any time desired through speakers or headphones to recreate the produced and processed sound waves which is then heard by the human ear.

PHYSIOLOGY OF THE EAR HOW THE BRAIN PROCESSES SOUND

"A sound wave is an air pressure disturbance that results from vibration."² The human ear detects both the sound pressure level (SPL) and frequency

of that sound wave. The audio frequency range for the human ear is 16Hz-20kHz with the best adaptation between 1kHz-3.5kHz (human speech is between the 80-260 Hz range). The sensitivity of hearing varies across this range as a result of the resonance properties of the ear and neural processing of the sound signal. A decibel represents the logarithmic ratio of the SPL as compared to the baseline or threshold detection of that sound pressure in the human ear. However, due to the frequency sensitivity variation (diminishment of detection) at the edges of the human hearing range, the perceived loudness of certain frequencies is a complex relationship defined by the loudness parameter phon.³ A representation of a unit phon and the graph of the hearing range of the human ear as a function of sound frequency and SPL is shown in **Figure 2** (ISO).

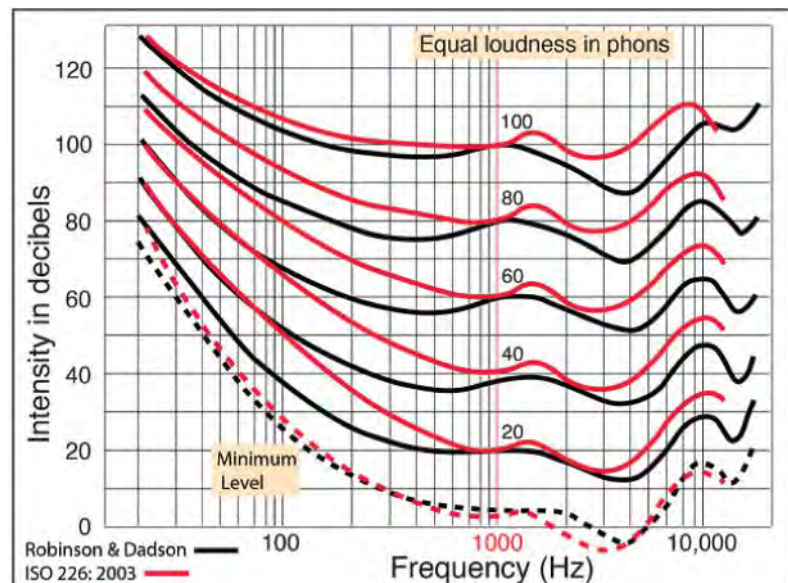
The human neurological processing lag from the initiation to detection of sound ranges from 6-10 ms.⁴ This 10 ms sensitivity is also seen in auditory sound localization which represents the perception of "space and depth," i.e. sound waves and their reaction to the environment.⁵ "By modifying the space when recording the different sounds separately and then integrating them, the final product can give the impression

of being performed 'live' in the same room at the same time (right back to the original intent of the design of recording systems)."¹ This is done by judicious use of reverb effects as well, mimicking the natural echoes one hears when listening to sounds live. Another example is use of a sound for tuning reference. If the brain's first information is a tuning reference, then a listener will use that reference for the tuning & harmonic relationships that follow. However, if that frame of reference changes, it changes the perception of what is in tune.¹ Lastly, the human processing of sound depends on a baseline that is initially established with regard to the Ambient sound. For example, when recording classical music before the music begins, there is often Ambient noise. If heard before any pitched information, the noise is perceived by the brain. If that noise is trimmed off and the first auditory information is pitched, the brain will not place as much emphasis on the noise and perceive it less. However, some noise is desirable as most humans find Digital Silence disturbing.

MICROPHONES

The microphone is as much an instrument as a musical instrument because a sound signal can be modified (distorted) at the microphone input.

Figure 2: ISO 226:2003 set of equal-loudness curves and the Robinson & Dadson curves with phon line depicting equal loudness perception at different decibels for 1000 Hz (phon = dB sound pressure level (SPL) at 1kHz).¹¹ From: <http://hyperphysics.phy-astr.gsu.edu/hbase/Sound/eqloud.html>



Collection of microphones: (left to right) Ribbon, two dynamic, and a condenser.



Tube sound amplifier. Guitar amplifier, preamp, and power amp detail, gain and tone control knobs.



A microphone is a transducer that converts sound pressure waves to a voltage using a diaphragm that oscillates (similar to the eardrum). How that diaphragm is controlled, as well as the desired signal outcome, determines the type of microphone used to capture a sound. The three types of microphones predominately used in music recording are dynamic (or coil-based), condenser (or capacitive), and ribbon.⁶

A dynamic microphone has the diaphragm connected to a coil of wire wrapped around a magnet and as the coil moves due to the diaphragm movement and across the magnet, a voltage is created on the wire. Speakers work on a similar principle but in reverse (transducing varying voltages to pressure waves for sound). Dynamic microphones are simple, durable, and passive designs. They are high mass, i.e. can handle higher sound pressure levels (dB) without damaging the microphone or adding unwanted signal distortion. They are omnidirectional or cardioid polar (capture sound from the front and sides and not the rear of the microphone). They are predominately used in live music situations and with louder sounds (such as guitar amplifiers, drums, or loud vocals). They also tend to filter out ambient noise better than condenser or capacitive microphones.

However, dynamic microphones are not best for capturing high frequency or low loudness sources of sound, which require higher sensitivity, so a condenser

or capacitive microphone is used. The electrically conductive transducing diaphragm in this microphone is aligned with a metal plate and as it oscillates the distance between the two metal plates change, thereby changing the capacitance between the plates and creating an electric signal. This signal needs 48V of 'phantom power' to power the audio electronics downstream, so it is not a passive detection system. These microphones are generally used in studios with good acoustic characteristics (not too much reflection) as they are sensitive and can detect subtle sounds as well as vocals and acoustic instruments. They have a fixed polar pattern of cardioid or omnidirectional and at times two diaphragms can be mounted closely together in the microphone allowing audio signal cancellation or mixing at the microphone input versus just downstream.

The third type of microphone is a dynamic 'ribbon or velocity' microphone which uses very thin corrugated metallic ribbon suspended in a magnetic field which moves with sound pressure and produces an electric signal. It is low mass leading to an excellent frequency response. It is bi-directional, so sound is picked up mainly on the flatter sides of the ribbon with minimal pickup of 'side' sounds. This could be useful in 'capturing a choir' allowing for the choir and reverberation in the room to be heard. Lastly, the SPL response is non-linear mimicking the human ear's response resulting in a more natural sound.⁷

AMPLIFIERS

The sound signal, which is now electrical, travels through to an amplifier. The amplifier enables signal energy intensity equalization on the track (digital or analog) due to the different qualities of the initial sound signals. This signal amplification can occur at the microphone and/or before the track recording. There are three types of amplification: pre, low-power, and power. Pre-amps are used for weaker sound signals increasing their power to levels that can be manipulated in the downstream processing equipment. Low-power amplifiers are primarily used to modify the sound signal in volume and frequency, often shaping the signal for aesthetic and mixing means. Power amplifiers are used to increase the sound signal intensity and drive speakers in the reproduction of the sound for hearing. All amplifiers endeavor to minimize noise while amplifying the signal.⁸

DIGITAL AUDIO WORKSTATION

All of the signals are then aggregated and managed in a Digital Audio Workstation (DAW), a software package which allows the manipulation of the recorded sound using digital sound tracks (analogous to the analog tape tracks used in the past). Each track represents a recording of a discrete sound signal. The DAW can aggregate, integrate, and process the different sound signals providing a variety of sounds for different engineers/music creators to

develop a final layered music product. This flexibility, with regard to the ability to process and mix the different sounds captured, can add depth and individuality to the music produced. As above, it is here that the audio signal can be modified with regard to frequency, dynamics, and time delay. In the past, this was done by manipulating the sounds with specifically crafted electronic units designed to distort the sounds in different ways and then assembling the different musical elements along side each other by recording on analog multi-track tape recorders. Sometimes the tape media was run backward for that sound manipulation.

ARCHIVAL

The final product or song is then 'copied' onto a readable media which is then distributed or sold to be played by various systems for a listener's pleasure. Interestingly, with the preponderance of digital production today as well as use of many digital sound samples, data management has become an issue. Some sampled songs can require over 1TB of storage. Moreover, archival media has evolved (5-10 years maximum for many media) and as the songs get transferred to another media and/or degrade while in storage (or lost), there is a concern that a lot of sounds and songs have been or will be lost.

ANALOG/DIGITAL/ ANALOG-DIGITAL HYBRID

As with most industries, computers have allowed for more higher quality outputs by individuals efforts (disaggregation of the knowledge or functionality) than was possible before. However, the best quality still comes from use of a 'profes-

sional' studio for more data capture and layering of those sounds into a musical product. Also, as in all other industries, the advent and use of the computer brought about much change in the music production process and end-product. In 2003, Dr. Art DeLagrange, *MA B '62*, shared some prescient thoughts on the use of computers in the engineering of music for *The Bent*:

"Aside from radio and recording, electronics was first used with microphones to amplify the voices of solo singers, eliminating the need for operatic voices. Next, it was used for instruments whose sound was not loud enough, such as a guitar... (and) mounting the microphone directly on the guitar to reduce extraneous pickup. But because the strings were usually metal, the pickup need not be acoustic at all, but could be magnetic... (which is) insensitive to ambient sounds directly. (Now) the pickup is an integral part of the instrument, not an addition...the logical extension of the electronic organ was the music synthesizer, basically a computer connected to a keyboard (which) can reproduce the sound of most common instruments, including a chorus of human voices (singing "aaahh"), plus unique sounds of their own. Often you are not hearing the instrument you think you are, but a synthesizer... . (P)erfection is usually achieved electronically; when you hear "one" recording you are usually listening to a composite of a dozen or more "takes" The frailty of human nature cannot compete with the computer. The promoter of a mega-concert cannot cancel because one singer has laryngitis; that part will be "lipsynced," if not the entire performance. If the sound all comes out of loudspeakers anyway, what's the difference?"

Digital Audio Workstation: Mixing board in sound recording booth with computers.



Rick Beato: Top 20 Inventions that CHANGED Music

- 1) Music notation/printing press
- 2) Radio
- 3) Internet
- 4) Television
- 5) Keyboard/Harpsichord/
Piano – Standardizing how musicians communicate
- 6) Compact Disc (digitization of music storage in portable form-media – 74 minutes of music)
- 7) LP/Vinyl Records
- 8) Personal Computer
- 9) Headphones
- 10) Walkman
- 11) Electric Guitar
- 12) IPOD
- 13) Social Media – disaggregation and decentralization of the control of the musical product
- 14) Phonograph – recording – disaggregation to time for the musical experience
- 15) MIDI standard – musical instrument digital interface; 16 channels - connect piano keyboard to computer (or any instrument)
- 16) Digital Audio Workstation (DAW) – most common application is PROTOOLS
- 17) Vacuum tube – tube amplifier
- 18) Magnetic tape – recording/
reproduction
- 19) Napster
- 20) Fuzz Petal

Notice that most of these inventions are due to the invention of electronics and telecommunications and they brought about the ability to modify, store, and decentralize aspects of music making and distribution. They also brought about the disaggregation of time and location for the making, performing, and distribution of the musical product. From a business perspective, they also allowed the musician the ability to have more control over their intellectual property if they so desire. From a consumer point of view, the inventions provide music portability and the ability to disaggregate, collate, curate, and store their music collection.

“THE UNDERSTANDING OF THE HUMAN SIDE OF THE RECORDING PROCESS IS A SIGNIFICANT PART OF RECORDING ENGINEERING; PERHAPS THE MOST SIGNIFICANT” — GEOFF FOSTER

Some music produced today is deemed ‘mediocre’ in some sense because it has been digitized and quantized so much that distortion that might be pleasing to the ear is lost. When dealing with a creative and aesthetic endeavor, the human response is key and varies individually. However, it seems that the organic nature of that response can at times prefer the analog technology in creative expression. As part of an answer to this loss of aesthetic value (fidelity and warmth), there is a resurgence of the use of some analog components in the music production. For example, “the saturation curve of analog tape is non-linear (as the sound placed onto/off the tape), which distorts the sound (compresses it) in a subtle way that adds a warmth and breadth to the human perception of that sound.”¹ To attempt to replicate this warmth and range with digital systems, the sample rate is increased to create sounds that are closer to an analog system; however, there is still loss in the lower end of the range; moreover, many times with over-processing, one can hear the digitization. Many recording engineers and musicians prefer to use

vacuum tube amplifiers with some of their musical instruments when recording stating they prefer the ‘warmth’ an amplifier brings to their sound creation. Moreover, there is an increased desire by many in the music industry to release recordings on vinyl disks again, in some cases with vinyl sales exceeding digital media. With computers, one can end up trying to optimize too many variables and the end-product isn’t satisfying. Constraints can help focus the creative process, thus the desire for some creators to have hybrid analog-digital components in their recording systems.

SUMMARY

What engineers design is usually a crude approximation of designs seen in nature, hence, the constant evolution of technology to try reach the pinnacle of natural designs. From the beginning of recording systems, we have moved from an attempt to ‘capture’ a live performance of a full cohort of musicians and instruments to capturing single musical efforts or mini sounds which are aggregated/integrated into a new sound product, which sometimes try to replicate a live

performance. Interestingly, as music production has become more technical, the desire to have a more organic and ear-pleasing sound has re-emerged, leading to a hybrid digital-analog environment for sound production. In the end, an engineer who uses the principles of the physical world to build tools that are useful to humans also builds the tools that enable humans to creatively express themselves.

.....
BRIDGET A. MOORMAN, BSME, MSBME, COL, USAF (Ret.) has 30+ years’ experience in the clinical engineering/digital health field working and consulting for large healthcare organizations as well as serving as chair of the board of examiners for certification in clinical engineering (2011-13). She has worked in bio-mechanical research, power-line relay design and space system launch, and telecommunications. As an Air Force reservist, Bridget served as IMA to the MILSATCOM Directorate. Her B.S. from Arizona State University (ASU) is in ME; M.S. in BME from Hartford Graduate Center/Rensselaer Tech; and MAS in healthcare informatics ASU College of Health. Her professional awards include the 2019 ACCE/HIMSS Excellence in Clinical Engineering and Information Technology Synergies Award. She is an advisor to the Tucson Alumni chapter (2015 -) and an Instrument Private Pilot, Single Engine Land.

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The STORY BEHIND The PHOTO

Announcing the Winter 2022 “Caption This Photo” Contest!

This photo, from the Winter 1995 issue of *The Bent*, was taken at the 89th Convention in Buffalo, NY. Following a session on Robert’s Rules of Order, chapters attempt to find ways to improve seconding a motion.

How to Enter: Send us your witty caption(s) for this photo from *The Bent* archives. If the judges vote yours as one of the top three (and you have not been a previous winner), **we’ll send you a TBP t-shirt of your choice!**

Email your entry to captions@tbp.org or mail to *The Bent* of Tau Beta Pi, Caption Contest, P.O. Box 2697, Knoxville, TN 37901-2697.



DEADLINE: TUESDAY, FEBRUARY 1, 2022.

The WINNERS of the Fall 2021 “Caption This Photo” Contest:

Readers representing a wide range of ages submitted 41 captions for the the Fall 2021 contest. You can read all entries, including captions and results from recent contests, at tbp.org/pubs/captionContest.cfm.

1ST PLACE:

“OK, this one looks good. Now we need 12,000 more just like it by 7:00 tomorrow morning.”

David W. Kortebein, *IL A '85*

2ND PLACE:

“Alan points to the flawed bow in the ‘Tau Beta Tie’ competition.”

Kai Chapman, *CA A '22*

3RD PLACE (2-way tie):

“Pull My Finger!”

Robert R. Shannon, *TN A '75*

3RD PLACE (2-way tie):

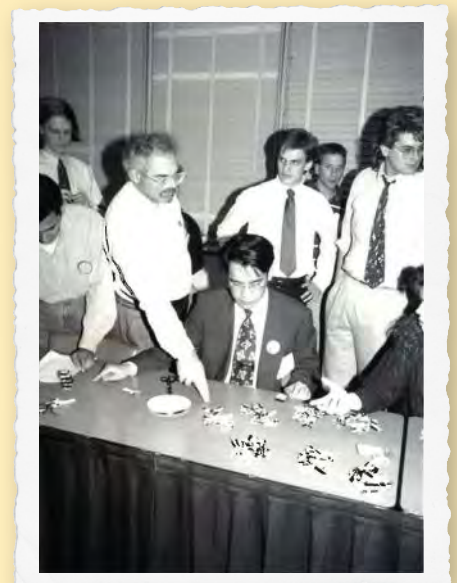
“These are the ones with the microphones in them. Give them to the new delegates so we can find out what they really think of the Executive Council’s new plan.”

Gregory M. Gatlin, *MD B '83*

**CONGRATULATIONS
TO OUR WINNERS!**

T-SHIRTS ARE IN THE MAIL.

► The Fall 2021 image (right) was taken at the 1993 Convention in West Lafayette, IN. Director of Rituals Alan R. Hirsch, *MA B '66*, points to the stacks of bows tied by members of the Rituals Committee for use at the model initiation.





THE ANNUAL REPORT OF THE PRESIDENT

WHAT A YEAR IT HAS BEEN!

GEORGE J. MORALES, Ph.D., *Florida Epsilon '06*
President of the Association through December 31, 2021.

As 2021 comes to a close, we look back on a year that began to see some of us return to on-site work, school, and the slow crawl back towards a sense of normalcy. While the Association was unable to meet the necessary quorum to hold Convention, the business of Tau Beta Pi continues to move forward. New chapter petitions are being submitted, and the creation of new training material for our professional development is trending nicely as we begin to see light at the end of the tunnel moving into 2022.

The contributions of our large volunteer groups such as District Directors, Advisors, and Engineering Futures Facilitators continue to keep our chapters engaged. However, it hasn't been easy! Due to the large collegiate chapters and varying rules/guidance from their respective colleges and universities on hosting in-person events, our dedication to these chapters and their growth has not diminished despite these challenges. Next year will see six additional collegiate chapter inspections, with two being international chapters in Qatar and UAE.

The Executive Council continued to meet remotely. During this time, members were willing to get involved through work in a variety of committees to continue to make progress towards our initiatives. Listening Sessions with our members have helped shape and guide our Diversity, Equity, and Inclusion Committee to address some of the concerns our members have voiced. The Fellowship Program awarded 28 Fellowships and 261 Scholarships for our students to continue their educational pursuits.

A difficult task I'm sure — as there are so many well-deserving Tau Bates! The Engineering Futures program has shifted entirely online and continues to provide excellent professional development content which allows our students and alumni alike to participate despite gathering or travel restrictions. It would take too much space to list all 1,000+ of our volunteers, **but I thank all of you for your continued support and dedication to our Society.**

Finally, it has been my pleasure to serve as president this past year. Although we couldn't meet in person, I feel that the efforts shown throughout these unprecedented times speak to the quality and character of our membership. *We continue to drive our mission by recognizing those who have conferred honor upon their alma maters by distinguished scholarship and exemplary character as students in engineering or by their attainments as alumni in the field of engineering; by providing leadership, professional development, career opportunities, and training for engineering students and alumni; and promoting lifelong alumnus member involvement. The work continues.*

I wish you all a very happy and healthy New Year. Until we meet again.

GEORGE MORALES works at Intel Corporation as a packaging research and development engineer. He joined the TBPI Executive Council in 2014, and was re-elected in 2019, serving in the roles of Secretary (2017), Treasurer (2018), Vice President (2020), and President (2021). His three degrees are in electrical engineering earned from Penn State University (B.S.) and Florida Atlantic University (M.S. and Ph.D.).

VIRTUAL RECRUITING FAIR

Since 2003, Tau Beta Pi has held a Recruiting Fair as part of the annual Convention. The goals of this event are to provide career-seeking assistance to our members, a chance for them to practice their “elevator speech,” and to help the Association defray the expense of bringing more than 350 delegates to the three-day Convention.

Being unable to hold an in-person Convention the past two years did not deter us from providing a recruiting event. Using Career Fair Plus’ virtual platform, the Corporate and Graduate School Recruiting Fair held October 18 and 19 was successful and worth the effort. Although we would like to have secured more corporate recruiters, we are encouraged by the level of activity: 444 candidates met by phone and video chats with 152 recruiters representing 45 graduate engineering programs, government agencies, and companies, within a total of 1048 meetings! Thanks to those of you who attended. A list of our recruiters is on the right.



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Follow us on social media and tag us, so we can see your TBPi images using **#taubetapi**.

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WORDPRESS BLOG: taubetapiathq.wordpress.com/

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A SPECIAL THANKS TO OUR RECRUITERS

We gratefully acknowledge the 2021 Virtual Recruiting Fair participants:

Analysis and Measurement Services
BAE Systems
Carlisle Construction Materials
Columbia University
Duplantis Design Group
Epic
FedEx
**The George Washington University
School of Engineering & Applied Science**
Honeywell FM&T
Intelsat
Iowa State University
Keck Graduate Institute
Kettering University
Lehigh University
MIT Leaders for Global Operations
Michigan State University
Michigan Technological University
New Jersey Institute of Technology
New Mexico Tech University
New York University
Tandon School of Engineering
**North Carolina State University
Engineering**
Northeastern University
Northwestern University SEAS
Ohio State University
PPI, a Kaplan Company
Purdue University COE
Purdue University — AAMP-EM
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University of Rochester
**University of Southern California
Viterbi School of Engineering**
University of Tennessee
Oak Ridge Innovation Institute
University of Texas at Dallas
University of Virginia Engineering
Vanderbilt University
Virginia Commonwealth University
Worcester Polytechnic Institute

Chapter ★ Project Awards



Alaska Alpha assisted with the construction of an ice arch above.



California Psi members polish the Bent monument on campus.



Social media post for California Alpha Gamma speaker series for students.



Illinois Alpha tech talk participants at event with University Research Park.

AL E University of South Alabama
34 Projects Assisted with judging for the virtual Mobile Regional Science and Engineering Fair and helped teachers assemble 3-D printers.

AK A University of Alaska Fairbanks
8 Projects Hosted “becoming an Alaskan engineer” online course for high school students and constructed an ice arch (50-year UAF tradition).

AR A University of Arkansas
34 Projects Participated in cleaning of Lake Sequoyah and hosted alumni via Zoom to discuss industry and to network.

CA E University of California, Los Angeles
46 Projects Served as student marshals during commencement and offered free tutoring and review session programs.

CA Ψ Univ. of California, San Diego
121 Projects Held an officers retreat to improve transitions and hosted web development workshops for high school students and initiates.

CA AB University of California, Riverside
35 Projects Sent out bi-weekly email newsletters with event reminders and hosted a Zoom lecture series for initiates and members.

CA AT San Francisco State Univ.
34 Projects Hosted “speed Tau Bating” for members to socialize via Zoom and a professional development workshop to prepare for career fair.

IL A University of Illinois at Urbana-Champaign
19 Projects Took part in remote ‘office hours’ to tutor high school students in STEM and hosted a professional tech talk with Keysight.

Chapter Excellence Awards 2020-21

These chapters were recognized to mark excellence in their performance in seven areas. Chapters with distinction, scoring 100 percent or more, are in bold:

- | | | |
|------------------------------|-----------------------------|------------------------|
| Alabama Alpha | Michigan Gamma | Ohio Kappa |
| Alabama Epsilon | Missouri Epsilon | Ohio Mu |
| Alaska Alpha | Nevada Beta | Ohio Nu |
| Arizona Delta | New Jersey Beta | Ohio Xi |
| Arkansas Alpha | New Mexico Beta | Oklahoma Gamma |
| California Eta | New York Gamma | Tennessee Alpha |
| California Psi | New York Omicron | Texas Zeta |
| California Alpha Beta | New York Pi | Texas Theta |
| Colorado Beta | New York Rho | Texas Nu |
| Colorado Delta | North Carolina Alpha | Virginia Gamma |
| Florida Gamma | Ohio Beta | Virginia Epsilon |
| Georgia Alpha | Ohio Gamma | West Virginia Alpha |
| Illinois Alpha | Ohio Delta | Wisconsin Alpha |
| Iowa Alpha | Ohio Epsilon | Wisconsin Gamma |
| Louisiana Alpha | Ohio Theta | Wisconsin Delta |
| Maryland Beta | Ohio Iota | |

Chapter Project Awards for outstanding performance during 2020-21.

IL Δ Bradley University

15 Projects Co-hosted a panel discussion on importance of industrialization during an era of a pandemic and made cards for St. Jude children.

IA A Iowa State University

141 Projects Held a Pi Mile Run fundraiser (26th year in a row) and participated in a “stash the trash” service project cleaning an I-35 ramp.

MD B University of Maryland

36 Projects Virtually transcribed historical documents for the Smithsonian’s digital archive and hosted a virtual PowerPoint party to socialize.

MI Γ University of Michigan

150 Projects Tested new K-12 MindSET modules for virtual application and promoted DEI discussions with chapter movie night.

MN A University of Minnesota-Twin Cities

32 Projects Held Zoom Tau Beta “Pi-thon” event to introduce Python coding language and hosted multiple professional recruitment events.

NJ A Stevens Institute of Technology

34 Projects Hosted virtual scheduling workshops for freshmen/sophomores and participated in STEM activities at a local Hoboken middle school.

NY K University of Rochester

52 Projects Co-sponsored nuclear engineering talk with Gary Whitaker and co-hosted an internship/summer REU panel for students.

OH K University of Akron

34 Projects Made protective face-masks for families at Ronald McDonald House and hosted “caption the Meme” competitions.

TN A University of Tennessee

26 Projects Organized UTK Engineers Day for 1,500+ local high schoolers and participated in a welcoming event for female engineering students.

TX A University of Texas at Austin

125 Projects Hosted a mental health workshop with Center for Mental Health speaker and made cookies together over Zoom.

WI A University of Wisconsin-Madison

70 Projects Volunteered for VOCALiD, an online site that speaks sentences for the voiceless and hosted a virtual alumni panel with career advice.



Illinois Delta members made Halloween cards for children at St. Jude’s in Peoria.



Iowa Alpha volunteers distribute pie to faculty/students in recognition of TBTi day.



Michigan Gamma removes invasive species at a park during “nature preservation day.”



Wisconsin Alpha created slides for their November general meeting.

A \$500 scholarship will be awarded to 10 chapters that received Chapter Project Awards for at least three consecutive years.

Alabama Epsilon

Arkansas Alpha

California Epsilon

California Psi

Iowa Alpha

Maryland Beta

Michigan Gamma

Ohio Kappa

Tennessee Alpha

Texas Alpha

THIS IS THE TENTH IN A SERIES OF ARTICLES THAT EXPLORE THE HISTORY OF SCIENCE AND ENGINEERING.

One way in which this history has been preserved is in the names of the scientific units that we commonly use. Those units will serve as starting points for these articles as we explore “Why do we call it a...?”

By: **Lyle D. Feisel, Ph.D., P.E. (ret.), Iowa Alpha '61**



WHY DO WE CALL IT A...

CURIE

At some time and in some fashion, virtually everyone hears about — and probably uses — the units for voltage, current, and power. Most people have experience with 120 volt outlets, 20 ampere fuses, and 100 watt light bulbs. I would wager, however, that relatively few people—even engineers and scientists—have much contact with the units of radiation. Quick! What’s the unit for measuring radioactivity? If you are one of the few who answered “bequerel,” you would be correct. That is the unit for radioactivity in the International System of Units (SI). It would be reasonable, then, for us to spend some time exploring the history of Antoine Henri Bequerel, for whom the unit is named. And in the future, we might do that. But bequerel is not the only correct response.

You might also have answered, “curie” and would still be correct because the curie is used extensively in the United States and some other countries for measuring radioactivity. So, since March is Women’s History Month and since Marie Curie is probably the most famous female scientist in history, let’s talk about the Curies, instead.

While Marie is certainly the most famous Curie, we need to include the rest of this very talented family in our history. Indeed, there is evidence that the curie unit was named not for Marie, but for her husband Pierre. I will keep him — and their daughters — in mind but will concentrate on Marie in this narrative.

We often think that Madame Curie was French and, indeed, she did spend most of her life in France. That is where she received most of her higher education, married, and did important scientific work. Actually, she was Polish. Marie was born and grew up in Poland, and never lost her affection for the country. She was born Maria Salomea Skłodowska on November 7, 1867, in Warsaw in what was then the Kingdom of Poland. Both of her parents were teachers, as was her paternal grandfather.

At that time in its tortured history, Poland was part of the Russian Empire and Russians controlled many aspects of life in the country. Maria’s father was fired from his teaching position and lost much of his property for harboring pro-Polish-independence sentiments.

The Russians also determined educational standards; for instance, they eliminated the teaching of laboratories in Polish schools. Maria's father took advantage of this by bringing the laboratory equipment home, where he used it to teach his daughters.

After receiving a basic education through gymnasium (high school), Maria wanted to attend a regular university, but could not because only men were allowed access to higher education. She could, however, enroll in the "Flying University." This was an underground institution that, unlike the regular universities, accepted women as students and taught uncensored Polish history. It existed through much of the late 19th century and was reestablished during the Russian occupation following World War II.

In the late 1880s, Maria's sister, Bronislawa, moved to Paris to pursue medical studies. Maria helped to support her by working as a governess and tutor while she continued her own studies in chemistry. In 1891, Maria joined her sister in Paris and commenced her studies at the University of Paris. She also became "Marie," the French version of her given name. During her student years, she was "on short rations," working as a tutor for enough income to support her spare lifestyle.

In 1893, Marie received a degree in physics, followed by a second degree in 1894. Degrees in hand, she went to work in an industrial laboratory where she met Pierre Curie, a science instructor at a Paris educational institute. Pierre provided support for Marie as she pursued her career and, in due course, he began to pursue Marie. During their courtship, Marie applied for a position at the University of Krakow but was denied because, of course, she was a woman. Marie and Pierre were married in July 1895.

In that same year of 1895 (the year my father was born, incidentally), a German physicist named Wilhelm Conrad Röntgen discovered that a cathode ray

tube emitted a high frequency electromagnetic radiation that could penetrate flesh and other light materials. He named that radiation "X-ray," since then, as now, X was the traditional symbol for an unknown. The next year, the aforementioned Henri Becquerel observed that uranium salts emitted similar radiation *spontaneously*, i.e., with no addition of external energy. Intrigued by these results, Marie Curie decided to pursue this field of study for her doctoral thesis.

Using an electrometer developed by her husband, she first sought to understand the nature of the rays emitted by uranium and the effects they caused. She discovered, for instance, that radiation caused air to conduct electricity, suggesting that something was changed in the molecules or atoms of air. She also suspected that the radiation was caused by some change in the uranium atom which suggested that the atom, hitherto considered indivisible, could, in some way, be changed.

As part of her investigation, she studied two minerals that contained uranium as well as other elements. Indeed, these minerals, pitchblende and torbernite, proved to emit more radiation than uranium alone, indicating that other elements contained in the minerals must be even more radioactive than uranium. One such element, she discovered, was thorium. There were others, however,

including some not yet discovered. In 1898, Marie and Pierre (who decided to join her in studying radioactivity) announced their discovery of two new radioactive elements, polonium and radium. Polonium was named in honor of Marie's native country and radium in recognition of its ray-emitting property.

In her forty-year career, Marie made many scientific contributions; far too many to describe in this short article. Among her many honors are two Nobel Prizes — one in physics, shared with her husband Pierre and Henri Becquerel (1903), and one in chemistry (1911). She was the first person to win two Nobel Prizes and only she and **Linus C. Pauling, OR A 1922**, have won the prize in two different fields. Throughout her career, she experienced discrimination because she was a woman. For instance, she was denied membership in the French Academy of Sciences in the same year she won her second Nobel Prize. No woman was admitted to the academy until 1962.

Marie was a consummate, dedicated scientist, but she also had a life. She gave birth to two daughters, Irène in 1897 and Ève in 1904. (Irène and her husband, Frédéric Joliot-Curie won the Nobel Prize in chemistry in 1935.) Marie endured the loss of her husband to a tragic accident in 1906 and raised her daughters alone. In 1911, it was revealed that she was having an affair with physicist Paul Langevin and was accused of being a homewrecker, even though Langevin was estranged from his wife.

Marie Curie died on July 4, 1934, of anemia, probably caused by her extensive exposure to radiation whose deleterious effects were just being discovered during her lifetime. She and Pierre are interred in lead-lined coffins in the Pantheon in Paris and their papers are preserved in lead-shielded storage. She was honored as a scientist and discriminated against as a woman and contributed immensely to the understanding of radiation. And that's why we call a curie a curie.



Pierre (left) and Marie (right) Curie.

BRAIN TICKLERS



Results From Summer

Perfect Scores

*Berthold, Kristopher D.	TX	B	'04
*Bohdan, Timothy E.	IN	Γ	'85
*Capelli, Ronald B.	MI	Γ	'73
*Couillard, J. Gregory	IL	A	'89
*Gaston, Charles A.	PA	B	'61
*Kimsey, David B.	AL	A	'71
*Parks, Christopher J.	NY	Γ	'82
Sylvester, Noah		Son of member	
Voellinger, Edward J.		Non-member	

Other

*Bannister, Kenneth A.	PA	B	'82
Dechman, Don A.	TX	A	'57
*Golemme, Steven S.	IL	A	'20
*Griggs Jr., James L.	OH	A	'56
Marks, Lawrence B.	NY	I	'81
Marks, Benjamin		Son of member	
*McHenry, S. Dale	MO	B	'81
*Norris, Thomas G.	OK	A	'56
*Riedesel, Jeremy M.	OH	B	'96
*Robertson, John A.	IL	A	'65
Varvel, Virgil		Non-member	
Routh, André G.	FL	B	'89
Salvia II, Joseph J.	DE	A	'98
Scott, Darrell J.	NC	Δ	'82
*Seigel, Timothy J.	PA	A	'80
Summerfield, Steven L.	MO	Γ	'85
Szostek, Renee	MI	A	'87
Zison, Stanley W.	CA	Θ	'83

*Denotes correct bonus solution

Summer Review

While the total number of entries for summer was relatively modest, the percentage correct for each scored Ticker was very high. The hardest problem was #5 (Toroid Planet), with 78 percent of submitted solutions correct.

The Bonus (Twenty Questions) wasn't as difficult for our readers as the judges anticipated; it drew more correct answers than either #2 (Tennis Rankings) or #5. The Computer Bonus (Seven Stones) inspired 10 responses, but only two could designate a set of stones that maximized the elder's age at 122.

Fall Answers

1: Cleopatra loves her **dad**.

Fall Answers Continued

2: There are **94,589** ascending numbers from 5,402 to 97,543,210, inclusive, that have no repeating digits, nor a 6 or an 8.

3: The chance of getting a perfect bridge deal is **$4!(13!)^4/52! = 1 / 2,235,197,406,895,366,368,301,560,000$** .

That comes from dealing the cards one by one and keeping track of the probability as $(52/52)(39/51)(26/50)(13/49)(12/48)(12/47)(12/46)(12/45)(11/44)(11/43)(11/42)(11/41)(10/40)(10/39)(10/38)(10/37)(9/36)(9/35)(9/34)(9/33)(8/32)(8/31)(8/30)(8/29)(7/28)(7/27)(7/26)(7/25)(6/24)(6/23)(6/22)(6/21)(5/20)(5/19)(5/18)(5/17)(4/16)(4/15)(4/14)(4/13)(3/12)(3/11)(3/10)(3/9)(2/8)(2/7)(2/6)(2/5)(1/4)(1/3)(1/2)(1/1)$.

4: **$16,853 + 68,539 = 85,392$** is the solution of $ABCDE + BCDEF = CDEFG$.

5: Mercury is the closest planet to Pluto about **1.5 percent** of the time. One method to solve this is a computer simulation of the planets in their orbits—this results in a range of answers depending upon how long the simulation is run. The second method is to look at seven pairs of intersecting circles—one circle centered on Pluto with radius of Pluto-sun distance, the other centered on the sun with radius of each sun-planet. Where the circles intersect determines where Pluto-sun distance equals Pluto-planet distance, and hence, what percent of the time the sun is closer than that planet. Since Mercury is so close to the sun, those percentages can be used. The product of those seven percents gives the overall percent for Mercury being the closest.

BONUS:

From basic physics, work done by expanding gas at constant temperature $= nRT \cdot \ln(V_2/V_1) = P_1 \cdot V_1 \cdot \ln(V_2/V_1)$, where V_2 is final volume and V_1 is initial volume.

The ship (with mass of 1000 kg) is initially at rest with 1000 kg of water in it. Let the pressure of the nitrogen gas be N_p . The initial pressure is 6 MPa. Let the volume of the nitrogen gas be N_v . The initial volume is 1 m^3 . Let the volume of the nitrogen gas increase by ΔN_v as some small amount of water is vented.

The volume of water vented is also ΔN_v . Therefore, the mass of water vented: $\Delta H_2O = 1000 \cdot \Delta N_v$.

The work done by that expansion is: $W = N_p \cdot N_v \cdot \ln((N_v + \Delta N_v)/N_v)$.

The work done by that expansion results in a delta of kinetic energy. Assume all of the kinetic energy is transferred to the water vented.

Since work is a change in kinetic energy which is $0.5 \cdot m \cdot v^2$. Therefore, $v = \sqrt{2 \cdot \text{work}/m}$. Hence, the velocity of the small amount of vented water: $v_{H_2O} = \sqrt{2 \cdot W / \Delta H_2O}$. The momentum of the vented water: $\text{mom}_{H_2O} = \Delta H_2O \cdot v_{H_2O}$. That results in the same momentum (opposite direction) being given to the ship.

That results in the ship having a delta velocity of $\text{mom}_{H_2O} / (\text{ship mass} + H_2O \text{ mass in ship})$.

Iterate until all of the water has been vented. That leaves the ship with a **final velocity of 61.7 m/s**.

COMPUTER BONUS:

$639,172^2 = 408,540,845,584$ is the only other six-digit number with all different digits where the square has none of the digits of the number.

New Winter Problems

1: University Cryptarithm

My younger son is now at UC Berkeley (*CA Alpha*), and one may recall from previous columns my elder son is at Cornell (*NY Delta*). At dinner one night before term, both boys were extolling the virtues of their respective universities and regaling the family with their experiences. As they traded stories, they were surprised to realize just how similar the schools appeared on the surface. Slightly perplexed by this, they asked me what I thought the difference was between BERKELEY and CORNELL. I replied that it was simply the very ESSENCE of the university. Even more befuddled, they began to dismiss my answer as frivolous and without merit until I showed them: BERKELEY - CORNELL = ESSENCE, and they finally understood what I said was true. Find a unique solution to the above cryptarithm. Standard rules apply: each different letter stands for a different digit, and each different digit is always represented by the same letter; no leading zeros are allowed.

—Jeffrey R. Stribling, *CA A '92*

2: Finding the Integer

Let N be a positive integer such that $N/2$ is a perfect square, $N/3$ is a perfect cube, $N/5$ is a perfect fifth power, and $N/7$ is a perfect seventh power. What is the smallest such N ?

—Unknown

3: New Student Habits

The principal of the girls' school was interested in the habits of her new students, so she sent her assistant to make some notes as they left their rooms. The assistant handed her the following tabulation:

Time	Left for	Name	Nationality	Sweater Color
9 A.M.		Ann	English	Ivory
10 A.M.		Beth	French	Jade
11 A.M.		Carol	German	Khaki
12 Noon		Doris	Honduran	Lavender

Unfortunately, only one item in each of the last three columns is correctly positioned against time. What the assistant actually observed was as follows. At 10 A.M., either Carol or Doris left but wore neither an ivory nor jade sweater. At one girl's departure time—it was either Ann or Beth—she was not wearing a khaki sweater and was not English nor French. One hour later, the girl who left wore neither a khaki nor lavender sweater. Carol did not leave at Noon, and the Honduran girl left at 9 A.M. Sort out the name, nationality, and sweater color of each girl and the time she left for class.

—Brain Busters! *Mind Stretching Puzzles in Math and Logic*
by Barry R. Clarke

4: Unique Passcodes

You wish to construct a 16-digit passcode (in base 10) which uses all ten digits from 0-9 at least once within the string. How many such unique passcodes can be generated, assuming order matters?

—Reddit posting

5: Red Rug with a Glitch

A man has a large square rug, an integral number of feet on a side, the design of which is a blue square with a red border. However, due to a manufacturing glitch, the blue square is off-center, although its sides are parallel to the sides of the rug. Because all four corners have become ragged, it is decided to trim the rug by cutting off a triangle at each corner by making four straight cuts, each just touching a corner of the blue square,

with the cuts made in such a way as to maximize the remaining area of the rug. When this was done, it was found that the total area discarded was an integral number of square yards that was exactly 10 percent of the original red area. What was the smallest possible original length of the rug's sides?

—New Scientist:
Susan Denham

BONUS: Consider a uniform rod of mass, m , and length L , sliding lengthwise on the level surface of an ice rink. Initially, the rod slides on a frictionless patch of ice, but it encounters an area where the surface is rougher and has a kinetic coefficient of friction μ . The tip of the rod comes in contact with the rougher surface at time zero. Find the initial velocity, v_0 , such that the rod stops precisely when the trailing end reaches the rough surface and the time t it takes the rod to come to rest.

—Luke B. Stribling

COMPUTER BONUS:

A positive integer $x > 1$ with prime factors $p_1, p_2, p_3, \dots, p_i$ that satisfies the relationship $1/p_1 + 1/p_2 + 1/p_3 + \dots + 1/p_i - 1/x = k$, where k is a positive integer, is known as a Giuga number. The first few Giuga numbers are 30; 858; 1,722; and 66,198. Let us define an n -th cousin of Giuga to be a positive integer $x > 1$ with prime factors $p_1, p_2, p_3, \dots, p_i$ that satisfies the relationship $1/p_1 + 1/p_2 + 1/p_3 + \dots + 1/p_i - 1/x = k/(n+1)$, where $1 \leq k \leq n$. Find the first ten 6th cousins of Giuga.

—Jeffrey R. Stribling, *CA A '92*

BTs continue on page 48.

IN MEMORY of DON DECHMAN



Don A. Dechman, *TX A '57*, TBII Brain Ticklers judge from 1996-2016, passed away on September 3, 2021, at the age of 86. Born on June 5, 1935, in Ft. Worth, TX, Don received his bachelor's and master's degrees in chemical engineering from the University of Texas at Austin and enjoyed a 30-year career with Union Carbide.

Don had a passion for math and solving complex math puzzles, playing poker & bridge, and was one of the first people to solve the Rubik's Cube.

In honor of Don's 80th birthday, his three sons: David, *VA B '82*, Ken, a Tufts graduate, and Jim, *TX A '89*, endowed the Tau Beta Pi Don A. Dechman Scholarship.



HOWARD & TAU UNIVERSITY BETA PI

Compiled By LeVern W. Faidley, Ph.D., *IA Alpha '67*, with editorial assistance from:
Robert E. Efimba, Sc.D., P.E., *MA Beta '63*, and the late Peter A. Keiller, Ph.D., *DC Alpha '72*.

Forward (A Shared History)

The key to success is teamwork and there have been many contributors to the success of engineering and Tau Beta Pi at Howard University in Washington, D.C., including students, faculty, administrators, and alumni. The six Tau Beta Pi members featured serve as examples. During the past 100 years under their leadership, Howard University's Engineering Department has opened the employment of black engineers to the nation's largest corporations and other employers, and made it possible for African-American architects and architectural styles to successfully compete with others. The District of Columbia Alpha Chapter has also demonstrated that a Tau Beta Pi Chapter at a Historically Black College or University (HBCU) can become a vital part of college life on their campus — and can successfully compete with other TBI chapters for national recognition and awards.

The Establishment of Howard University

The U.S. Congress chartered Howard University (HU) on March 10, 1867. President Andrew Johnson signed the official Charter establishing HU and proclaimed the school "a University for the education of youth in the liberal arts and sciences open to all races, sexes and social classes." The new institution was named for General Oliver Otis Howard, a Civil War hero, who was both the founder of the university and, at the time, Commissioner of the Freedmen's Bureau. He served as president of the university from 1869-74. In its first five years of operation, Howard University educated over 150,000 freed slaves. From the beginning, there was a complicated relationship between HU and the federal government. Early funding came from endowments, private benefaction, and tuition. Subsequent, major funding was provided by an annual congressional appropriation, administered by the U.S. Department of Education and with additional financial backing provided by the U.S. Department of the Interior. From 1867 until 1926, Howard had a white appointed university president. In 1926, Dr. Mordecai Wyatt Johnson Sr.,

became HU's first African-American University President, serving until 1960.

The Introduction of Engineering

In 1907, the board of trustees approved two-year programs in civil, electrical, and mechanical engineering leading to bachelor's degrees. Howard, the first American university to offer engineering education to people of color, established those programs and introduced them into the curriculum of the School of Manual Arts and Applied Sciences. A four-year curriculum leading to the bachelor's degree was established in 1911 and a separate building was constructed and equipped. Eight years later, the School of Manual Arts and Applied Sciences was reorganized into the College of Applied Sciences, which included the departments of architecture, engineering, art, and home economics.

Lewis K. Downing, MI G 1921

The first dean of engineering at Howard University was Lewis King Downing, born on January 2, 1896, in Roanoke City, VA. He was a 1916 graduate of Johnson C. Smith University in Charlotte, NC. Subsequently, he attended HU graduating with a bachelor of science degree in civil engineering from the School of Engineering and Architecture (SEA) in 1921. He then attended the Massachusetts Institute of Technology, where he was the first black graduate of the Sloan School of Management undergraduate program. He returned to HU in 1924 as a civil engineering instructor in the SEA and was promoted to assistant professor and acting dean in 1926. He received a master of science in engineering degree from the University of Michigan in 1932. In 1934, the SEA was established as a separate unit of HU in recognition of the distinctiveness of the engineering and architecture professions. In 1936, Dean Downing was promoted to professor and dean of the SEA. Initially the school faced numerous obstacles including persistent low enrollment, budgetary disappointment, difficulty in attracting the number of quality faculty needed for a high-level engineering program, and advice from numerous high-level professionals to curtail the program. Fortunately, he and the dedicated members of his small faculty maintained their determination to create high quality engineering degree programs equivalent to those at state and private universities.



Lewis King Downing 1960.

Under Dean Downing's administration, the SEA rose from a loosely knit, unaccredited division with 38 students to a fully accredited engineering program with more than 900 enrollees. Howard was the first HBCU to have a fully accredited engineering program, under his leadership. He was also instrumental in removing the racial barriers which denied employment to black engineers in many of the nation's largest corporations. He brought to the HU campus representatives of many major companies and others to inspect the work of his students. At the time of his retirement in 1964, HU had graduated more black engineers than all of the nation's other colleges and universities combined and over 500 companies were recruiting Howard's engineering graduates. He was a member of more than a dozen professional societies and also served as advisor and consultant to highway and engineering agencies in Washington, D.C. and throughout the Mid-Atlantic area. In recognition of his contributions to HU, the engineering and architecture building constructed in 1952 was formally named Lewis King Downing Hall in a 1974 dedication ceremony. National recognition and awards he received during his 40 years as dean included honorary degrees of doctor of science conferred on him by Johnson C. Smith University in 1953 and Virginia State College in 1959. He was elected a Fellow of the American Society of Civil Engineers, a member of the Washington Academy of Sciences, the American Society for Engineering Education, and the National Technical Association, as well as Pi Mu Epsilon, Beta Kappa Chi Scientific Honor Society—the first African American STEM Honor Society, and Alpha Phi Alpha—the first intercollegiate Greek-letter fraternity established for African-American men.

He was initiated into Tau Beta Pi as a member of the MI Gamma Chapter at the University of Michigan, by the MD Beta Chapter at The University of Maryland on April 16, 1955. It is believed he has the distinction of being the oldest African-American TBPI member. Lewis King Downing died on October 19, 1967.



Howard University Engineering and Architecture Faculty in 1949. Including: Dean Lewis Downing, first row, 4th from left; Howard Mackey, first row, 3rd from left; & Walter Daniels, third row, 2nd from left.

Howard H. Mackey, DC A 1924

Howard Hamilton Mackey was born on November 25, 1901, in Philadelphia, PA. He had an early interest in architecture and building design and during the summer of 1920, he worked for architect, William A. Hazel, who was at that time connected to Howard University. He attended the University of Pennsylvania studying architecture and graduated in 1924 with a bachelor of science degree in architecture. Following graduation, he began teaching in the Department of Architecture at Howard. For the first several years, he would return to Philadelphia each summer to gain practical experience working in the office of architect Howard H. Jefferson. In 1929, he became acting head of the Department of Architecture at Howard. With the onset of the Great Depression, an attempt was made to abolish the department; fortunately, this effort was not successful.

In 1936, he took a one-year sabbatical leave to pursue a master of architecture degree at UPenn, which he received in 1937. Upon his return to HU, he was promoted to associate professor and head of the Department of Architecture, also serving as director of the architecture program. Under his leadership, Howard's five-year architecture program became the first at an HBCU to be accredited by the National Architecture Accrediting Board. He developed the Department of Architecture from a small, obscure educational unit of three



Howard H. Mackey 1945.



Lewis King Downing Hall: home of the Howard University College of Engineering & Architecture.

students to an enrollment, in 1960-61, of 164 students from 28 states and 13 foreign countries.

While on sabbatical in the 1950s, Mackey became an adjunct instructor in civil engineering at the University of Maryland, administering a U.S. Department of State Foreign Operations Administration aided-self-help housing program in British Guiana and Surinam to teach people the techniques of building their own low-cost homes. Through his three years of effort, approximately 4,500 low-cost homes were designed and built under the government's public housing programs.

Mackey was also largely responsible for the architectural aesthetics of the HU campus and the form, direction, and future of American public housing. In 1931, he organized an exhibition in the university's art gallery, highlighting the design work of the few licensed, practicing African-American architects in the United States at that time. Two of the participants in the exhibition were Hilyard Robinson, an east coast Howard educated architect, and Paul R. Williams, a leading west coast architect. Robinson respected Williams' success and stature in architecture and suggested that since black architects were prevented from bidding on government projects, they form a relationship with Irving Porter, a well-connected white architect in the Washington, D.C., area. Together, the three of them proposed a number of projects to the federal government. Their first success was the 1934 innovative design for Langston Terrace in D.C. Completed in 1937, this nationally acclaimed public housing project became a model for public hous-

ing projects in many parts of the country and gave Williams and Robinson the local and national stature needed to apply for commissions with the federal government, including those for the HU campus.

While prior to 1937, nearly all campus buildings were designed and built by white architects selected by the U.S. Department of the Interior, beginning in 1938, many of the commissions went to the joint-venture practice of Robinson and Williams. As a result, the traditional Victorian-revivalist styles of building designs on the HU campus were replaced by the modern streamlined look both men favored. Seven named buildings designed by Robinson and Williams were constructed on the campus including the 100,000 square-foot ultra-modern, U-shaped Engineering and Architecture Building that was completed in 1952. The building contained offices, classrooms, and state-of-the-art laboratories comparable to those at the nation's other leading universities with fully accredited engineering and architecture programs.

A registered architect and a member of the American Institute of Architects, Mackey gained Fellowship status, in 1962 with the AIA, and in 1983 received their "Whitney M. Young Jr. Citation" for his influence on African-American architects in the United States. Membership in other professional organizations included: Association of Collegiate Schools of Architecture, Architectural League of New York, American Society of Engineering Education, National Technical Association, and the board of trustees of the Council for the Advancement of the Negro in Architecture.

Howard Mackey served as professor and Director of the Architecture Program at Howard University for 32 years until his formal retirement in 1968. Shortly after retiring, he returned to HU to help create a program in city planning within the School of Architecture and was awarded a Ford Foundation grant to implement the new School of Architecture and Planning.

He was initiated into Tau Beta Pi by the DC Alpha Chapter as a member of the class of 1924 on May 14, 1966. Howard H. Mackey died on August 20, 1987.

Walter T. Daniels, AZ A 1929

Dean Walter T. Daniels, Ph.D., was born on April 26, 1908, in Texas. He attended the University of Arizona and received his bachelor's of science in civil engineering in 1929. He then attended Iowa State College (now Iowa State University) where he received his master of science degree in civil engineering in 1932. Following graduation, he worked at several HBCUs, first as professor of mechanical arts at Prairie View Agricultural and Mechanical College, (now Prairie View A&M University) in Prairie View, TX. In 1934, he became professor of physics at the Agricultural and Technical College of North Carolina (now North Carolina Agricultural and Technical State University) in Greensboro, NC. He also taught at Southern University in Baton Rouge, LA, before returning to Iowa State, where he graduated with a Ph.D. in civil engineering in 1942. He has the distinction of being the first African-American to receive a Ph.D. in engineering from Iowa State.

Daniels joined the Howard engineering faculty in 1943, where he was a civil engineering professor for the next 33 years, teaching mechanics, structural engineering, and topographic drafting. He was instrumental in the expansion of Howard's Civil Engineering Program and helped lead efforts to recruit minorities to the field. He also assisted in the development of HU's materials testing laboratory and made the structural design for the university's L.K. Downing Hall of Engineering, for which he won an award in 1952 from the Greater Washington Board of Trade.

In 1950, as a member of the American Society of Civil Engineers (ASCE), he helped found the organization's HU student chapter. In 1978, in recognition of his work establishing and developing the graduate civil engineering program at Howard, the ASCE elected him to its highest rank as an honorary member (now called distinguished member) of the society — the first African-American ASCE member to receive this honor.

Dr. Daniels was initiated into Tau Beta Pi by the AZ Alpha Chapter at The University of Arizona on April 26, 1952, as a member of the AZ Alpha class of 1929. Following his initiation, he, along with other TBPI faculty members at Howard, encouraged and assisted engineering students who met the requirements for membership, to petition for a Tau Beta Pi chapter at Howard University. At the 1955 TBPI National Convention, the petition was approved. The District of Columbia Alpha Chapter was formally installed at Howard on March 10, 1956, becoming the 100th Chapter of the Association and the first TBPI chapter at an HBCU. In recognition of his contribution in establishment of the chapter, Dr. Daniels was elected by the student members to serve as the chapter's Chief Advisor, a position he held for many years.

Walter T. Daniels retired from HU in 1976 and died on May 3, 1991.

Irving W. Jones, DC A '53

Irving Wendell Jones, Ph.D., was born on November 16, 1930, in Washington D.C. He received his bachelor of science degree in civil engineering (magna cum laude) from Howard in 1953. While a student, he was a member of the student council, the engineering and architecture honor society, and was also a varsity tennis athlete. He served in the U.S. Air Force from 1953-56. After leaving the Air Force, he attended Columbia University, where he was a Guggenheim Fellow in the Institute of Flight Structures. He earned a master of science degree in applied mechanics from Columbia, and in 1967, he received his Ph.D. in applied mechanics from the Polytechnic Institute of Brooklyn.

Dr. Jones began his professional career in the aerospace industry in 1957, working as a structural methods engineer for Grumman Aerospace Corporation in Bethpage, NY, followed by a year with the Fairchild-Hiller Corporation in Bayshore, NY, where he was structures group leader in their Space Systems Division. In 1963, he joined Applied Technology Associates, Inc., as assistant director, where he performed and supervised research, development, and engineering analysis projects in the area of structural mechanics. He made significant contributions to the country's aerospace programs, including the F-111 swing-wing fighter plane and the Apollo Lunar Landing Module. He also participated in studies on the feasibility of a lunar landing and was active in research to develop methods for using computers as an engineering tool for structural design and analysis.

In 1969, he was hired by Howard as an associate professor in the Department of Civil Engineering. His main task was to organize the new graduate program in civil engineering, which included development and teaching of graduate level courses in structures and mechanics, as well as, performing and supervising research. He was promoted to professor and chair of the Department of Civil Engineering in 1972. During his tenure as department chair, the graduate programs expanded to encompass both master and doctorate degree programs. He took a two-year leave of absence to work as a structural engineering specialist for the Aerospace Corporation, El Segundo, CA, in support of the Air Force space program. Dr. Jones returned

to HU in 1983 as a professor in the Department of Civil Engineering and director of the Computer Learning and Design Center. He was also a member of the HU Large Space Structures Institute, supported by the National Aeronautics and Space Administration (NASA). The work of the institute related to the modeling, dynamics, and control or optimization of large space structures. Dr. Jones' involvement related to deployable dynamics, particularly in the development of rigid structures that could be constructed on Earth, folded to fit in a space shuttle, and opened after being transported to space.

His involvement with Tau Beta Pi began while he was a student at Howard. He was included as a charter member of the DC Alpha Chapter at HU when it was installed in 1956 and was formally initiated as a TBPI member on April 27, 1957, as part of the class of 1953. During his time as chairman of the civil engineering department and later as a professor in the department, he served as DC Alpha Chapter Chief Advisor and Treasurer. In 1975, he recruited Dr. Robert Efimba to join the civil engineering faculty as an assistant professor. He convinced Dr. Efimba to become a DC Alpha Chapter faculty advisor and later groomed him for the position of Chief Advisor. When Dr. Efimba became Chief Advisor in 1987, Dr. Jones continued to serve as an advisor and treasurer until his retirement in December 1998. Dr. Jones died on September 7, 2000.

Continues on page 40.



Irving W. Jones in 1953.



Irving W. Jones in 1977.

IN THE COLLEGES

Tau Bates having an impact at institutions of higher learning.

Lt Col Brian T. Bohan Ph.D.

New York Theta '05

Brian is a recipient of the Clarkson University Dilip Ballal Early Career Award. He is an assistant professor of aeronautical engineering in the graduate school of engineering and management at the Air Force Institute of Technology. His research focuses on compact gas-turbine combustion, engine controls, heat transfer, and alternate methods for manufacturing turbomachinery.



Michael F. Howland Ph.D.

Maryland Alpha '16

Michael has joined the department of civil and environmental engineering as an assistant professor at MIT. He was a post-doc at Caltech, and earned a B.S. in ME from Johns Hopkins University. His research encompasses the flow physics of Earth's atmosphere and the modeling, optimization, and control of renewable energy generation systems.



Jerome P. Lynch Ph.D.

New York Iota '97

Jerome has been named dean of Duke University's School of Engineering. He is a nationally recognized expert in advanced sensing and information technologies for monitoring civil infrastructure systems. He previously served as department chair and a professor at the University of Michigan, and co-directed the UMich Urban Collaboratory Research Institute.



SPOTLIGHT: NASA's new Space Technology Research Institute (STRI)— Georgia Tech is one of 11 partner universities that will receive \$15 million over five years to fund the Joint Advanced Propulsion Institute (JANUS) — “a new STRI to develop strategies and methodologies to surmount limitations in ground testing of high-power electric propulsion systems.” **Mitchell L.R. Walker, Ph.D., MI G '99**, is the principal investigator and will serve as director of JANUS. He is a professor of aerospace engineering and interdisciplinary team leader of 17 researchers from across the country. “The challenge is to get electric propulsion devices big enough to push spacecraft and cargo to their destination fast enough,” said Dr. Walker.

New Degree Program to Prepare Business-Oriented Engineering Leaders— Advice from Ohio manufacturers led to the creation of a new engineering technology degree program at The Ohio State University. **Kristina M. Johnson, Ph.D., NC G '81**, OSU President, said, “we need to listen attentively to Ohio businesses in order to create a workforce they need... .” The new bachelor's degree program launched last fall, has a concentration in manufacturing, and will expand to more campuses by 2023. With the resurgence of manufacturing, there is increased demand for college graduates with a combination of skills in engineering, manufacturing, and technology. The program aims to develop engineering leaders for tomorrow in the highly automated industry.

Anthony J. Marchese Ph.D.

New York Gamma '89

Anthony has been appointed dean, college of engineering at the University of Rhode Island. Previously, he worked as associate dean for academic and student affairs in the college of engineering at Colorado State University. His expertise is in methane emissions and clean energy and has served as chair of the U.S. Sections of The Combustion Institute, since 2019.



Dylan A. McCreedy Ph.D.

Utah Alpha '08

Dylan was named a fellow for the new initiative, Scialog: Advancing Bioimaging, in which promising early-career scientists take on the challenges involved in enhancing high-resolution imaging of tissues to support basic science and disease treatment. A Texas A&M University assistant professor and biologist, his research investigates the roles of early inflammation after spinal cord injuries.



James A. Menart Ph.D.

Ohio Mu '84

James is recipient of the Frederick A. White Distinguished Professor of Professional Service at Wright State University (WSU). He joined WSU in 1996, is a professor of engineering, and established the first master's degree program on renewable & clean energy engineering, collaborating with three other institutions. His research has brought in more than \$3 million in external grants.



Mark Monmonier Ph.D.

Maryland Alpha '64

Mark is recipient of the Chancellor's Citation for Excellence Lifetime Achievement Award from Syracuse University. He retired May 2021 after a nearly 50-year career with the Maxwell School. A Distinguished Professor of geography and the environment, he is "arguably the most influential academic cartographer of the past 50 years," author of 20+ books, and served on EPA panels.



Hadil S. Mustafa Ph.D.

California Iota '07

Hadil is a recipient of the 2020-21 Outstanding Faculty Award at California State University, Chico. She joined CSU Chico in 2014, is an associate professor of engineering, and has been focused on outreach (specifically to women and underrepresented groups in STEM). Chief Advisor to the CA Alpha Alpha Chapter, she is manager and creator of the EECE tutoring center, since 2017.



Siddha Pimputkar Ph.D.

Illinois Beta '06

Siddha is the recipient of an NSF CAREER Award "to develop a novel method of growing bulk single-crystal nitrides—an advance that could lead to more-efficient, less-costly electronic devices." He is an associate professor and materials researcher at Lehigh University, proposing a rethinking of how to initiate and sustain crystal growth—overcoming known limitations of the art.



FACILITIES: LA Tech Grad Helps Rebuild Complex in Honor of Former Professor—

When the Lady Techster soccer complex was damaged by a tornado in 2020, **Timothy J. Cutt, LA G '83**, donated \$250,000 to help rebuild and upgrade the facility. The field is named in honor of his former engineering professor **Robert M. Caruthers, Ph.D., LA G '61**, who passed away in 2016. "Dr. Caruthers was a humble leader who cared deeply for students at Louisiana Tech," Cutt said. He taught for nearly 30 years and led the petroleum engineering and geosciences program at LA Tech. Cutt is CEO of Cobalt International Energy and the 2015 Distinguished Alumnus for the college of engineering & science.

Gift Helps Launch VA Tech Innovation Campus—

Boeing recently committed to a multi-year donation in support of a graduate technology campus at Virginia Tech. The \$50 million gift will "provide scholarships, foster faculty and researcher recruitment, and fund programs for underserved K-12 students pursuing high-tech degrees." VA Tech President, **Timothy D. Sands, Ph.D., CA A '80**, commented that the donation would help establish the campus and community as a "major tech hub." Boeing CEO David Calhoun said the gift is "meant to promote a skilled and diverse workforce." Construction of the VA Tech Innovation Campus is expected to begin in the fall and the first building is set to open in 2024.

Sindee L. Simon Ph.D.

Connecticut Alpha '83

Sindee has been named head of the department of chemical and biomolecular engineering and professor at North Carolina State University. Recognized as a leader in the area of polymer physics, she previously taught at Texas Tech University as a Distinguished Professor, and earned her B.S. degree in chemical engineering from Yale University. She is a Fellow of AIChE, APS & SPE.



Pingjuan L. Werner Ph.D.

Pennsylvania Beta '90

Pingjuan was named interim chancellor at Penn State DuBois in July for the third time, previously in 2013 and 2016. She joined DuBois in 1990, rose through the ranks to engineering professor, with a concentration in electrical engineering with research interests in electromagnetic metamaterials. She is a PSES Outstanding Teaching Award recipient and senior member of IEEE.



Kumar Yelamarthi Ph.D.

Ohio Mu '04

Kumar has been selected associate dean of the college of engineering at Tennessee Tech University. Previously, he served as director for the school of engineering technology and professor at Central Michigan University, where he launched a graduate engineering program. His research interests focus on the areas of Internet of Things, wireless sensor networks, and edge computing.



Alumni Giving

New Donor Recognition Clubs

The Donor Recognition Clubs are part of our effort to recognize a donor's total lifetime cumulative giving to Tau Beta Pi. **THANK YOU** to the 518 TAU BETA PI ALUMNI and others who made donations to the Association totaling \$499,323 between August 1 and October 31. Gifts received after October 31 do not appear here but will be published in the Spring 2022 issue. These club names and amounts, recently updated by the TBPI Executive Council, are set at the following levels:

\$1 MILLION+ Williams Club

Edward H. Williams Jr., Sc.D.
PA A 1875, Founder of Tau Beta Pi

\$500,000+ Heikes Club

Irving A. Heikes, PA A 1885
1st student member

\$250,000+ Harelson Club

Katharine C. Harelson, KY A 1924
1st Women's Badge (WB) recipient

\$100,000+ Matthews Club

R.C. Matthews, IL A 1902
1st Sec.-Treasurer of TBPI

\$50,000+ Franklin Club

Marjorie H. Franklin, KS A 1957
1st woman initiated into Sigma Tau

\$25,000+ Nagel Club

Robert H. Nagel, P.E., NY D 1939
2nd Sec.-Treasurer of TBPI

\$10,000+ Clarke Club

Edith Clarke, WB #95
Inventor of graphic calculator

\$5,000+ Evans Club

Henry B. Evans, Ph.D., PA A 1893
1st president of Tau Beta Pi

\$2,500+ Eaves Club

Elsie Eaves, CO B 1920, WB #24
Influential civil engineer

\$1,000+ Downing Club

Lewis K. Downing, MI G 1921
1st Black HBCU engr. dean

\$500+ Moore Club

A.D. Moore, PA G 1915, TBPI presi-
dent, Fellowship Program founder

\$250+ Forman Club

George W. Forman, IL A 1941
Led TBPI/Sigma Tau merger

NOTES:

1. Names preceded by SPEC denote gifts from non-members.
2. Names marked with a † symbol are of deceased members in whose memory donations were made either by relatives and friends or through bequests.



Nagel Club
Peter F. Salamon Jr.
 OH A '71

I am pleased to support TBP and future engineers. My pocket protector is a giveaway that I'm still an engineer.



Clarke Club
Leo Millstein
 IN A '70

I am proud of TBP's mission in promoting academic excellence in engineering colleges.

Moore, Forman & Pre-Club Members Continue on website

Due to the number of alumni contributors, the Moore, Forman, and Pre-Club Members will be acknowledged on our website (PDF) at: www.tbp.org/?AGP. All donations are essential to the continued success of the Association, but due to rising print costs of each issue, these donors will be listed with

all of the other contributors in a protected PDF document on the website. If you have questions or concerns, please contact development@tbp.org. Thank you for your understanding as we try to produce an enjoyable and cost effective magazine for our readers.

\$1 MILLION+ Williams Club

No alumni gifts for this quarter

\$500,000+ Heikes Club

No alumni gifts for this quarter

\$250,000+ Harelson Club

TX A Brill, Arno William '71

\$100,000+ Matthews Club

CA Δ †Nelson, Thomas Adams '49
 OH Γ Rockow, Ralph Arthur '58
 OR A Brandt, Larry Don '67

\$50,000+ Franklin Club

AZ B Myers, Jerry Elwyn '70
 PA Δ Goldstein, Steven Saul '65

\$25,000+ Nagel Club

CA A Kepler II, David Edwin '75
 IA A Faidley, LeVern William '67
 MI E Schmuhl, John Curtis '71
 OH A Ferencz, Robert Mark '80
 Salamon Jr., Peter Francis '71
 OH Δ Robe, Richard '55
 SD A Gomulinski, Tricia E. '98
 TX H Trich, John Albert '70

\$10,000+ Clarke Club

SPEC Anonymous '00
 AR A Brotherton, Robert Harold '67
 CA Δ Duckworth, Jack E. '66
 Fong, Frank Moodo '69
 CA T Anonymous '96
 IL A Luzbetak, Paul Daniel '96
 IN A Millstein, Leo '70
 IA A Crawford, Brian Matthew '04
 LA E Champagne Jr., Pierre '76
 MA B Anonymous '67
 MI A Colbry, Dirk Joel '06
 Colbry, Katy Luchini '99
 MI E Gomulinski, Curt Dennis '01
 MO B McHenry, S. Dale '81
 MO Γ Gibbs, Kenneth Paul '76
 PA H Hettche, Ray Raymond '61
 PR A Garcia, Carlos E. '77
 TX Δ Rushing, Jay Alan '76
 VT A Brand, Ronald Parsons '60
 VA B Hogan, James Campbell '70
 WA B Moors, Donald Edward '55
 WV B Teti Jr., John J. '71

\$5,000+ Evans Club

AZ A Carrillo, Danny J. '95
 CA B Marshall III, J. Howard '57
 CA Γ Kwok, Munson Arthur '62
 CA H Crotchett, Denton Robert '71
 CA A Crews, Brian '70
 Holl, Sue '76
 CA M Sciacca, Joan Michelle '87
 CA Y Alexander, Joseph William '06
 Alexander, Rachel Kristin '15
 DE A Gardiner Jr., Francis Espey '62
 FL A Lewis, Becky Ann '04
 FL E Cowan Jr., David James '14

IL Γ Ayres, Richard Owen '79
 IN A McDonald, John Douglas '73
 IA A Krambeck, Scott David '82
 KS A Reid, Jack Powell '57
 KS B Wilson, Bryan Keith '85
 MI Δ Klimaszewski, Richard A. '65
 NJ A Ghosh, Subhendu '89
 NJ Γ Kenney, Thomas Edward '70
 NJ Δ Yu, Jeffrey Chih-ping '89
 NY B Leader, Jeffery James '85
 NY E Hellman, Martin Edward '66
 NY Π Demmel, Hans George '83
 OH A Ikeda, George Toshinori '54
 SC B Daley, Leslie N. '71
 SD B Ufford, Donald A. '87
 UT Γ Panatier, Michael James '71
 VA B Anderson, Mark Evan '76
 WA A Pierce, Russ W. '70

\$2,500+ Eaves Club

AL B Andrzejewski, Joseph R. '90
 AR A Newtown Jr., Glenford A. '69
 CA E †Endo, Frederick Y. '57
 CA N Chew, James S.B. '84
 CA P Kraft, Lyle David '87
 DC Γ Keene, Warren Elmer '57
 FL A Passman, Alan Joseph '06
 IL B deVries, Dave A. '85
 IN A Hale, David Charles '59
 KS B Henderson, Wesley Val '76
 KS Γ Fowler, Eddie Randolph '57
 LA A Richardson, John Daniel '72
 ME A Gilman, Cynthia Margaret '80
 MI Γ Stewart, Steve Russell '66
 MI Δ Ponticello, John Charles '78
 MI E Sluchak, Thomas John '77
 MI Z Cookman, Jordan C. '94
 MN A Petesch, Douglas John '84
 Sandell Jr., Nils Richard '70

Alumni Giving



Downing Club
Benjamin W. Remondi, Ph.D.
 DE A '67
*I support the Univ. of Delaware
 and TBII knowing help was
 essential for me to go to college.*

Eaves Club continued

- MO A** Oberlag, Gerald Allan '66
- NE A** Steube, Milan Ray '74
- NJ B** Carey, Mark '77
- NJ G** Mauermeyer, Henry A. '72
- NM B** Sullivan, Thomas Daniel '74
- NY B** Phillips, Glen E. '71
- NY T** Olenik, Anthony Michael '08
- NC A** De Haas, Cynthia '91
- OH A** Hamilton, Joshua J. '09
- OH G** Wolff, Mark Frederick '88
- OH I** Strausbaugh, Patrick Dennis '86
- OH N** Struebel, Jonathan Paul '04
- OR A** Jones, Reilly '75
Milton, Stuart W. '84
- PA A** Lasser, Howard Gilbert '50
- PA H** Hills, Frederick James '61
- SC B** Husband, D. Mark '83
- TN A** Davis Jr., Fred Thomas '74
Jarratt, James Stroud '68
Riggs, Donna R.H. '87
- TX A** Stanley, William Robert '94
- TX B** Glenn, Stephen W. '66
- TX G** Sandmann Jr., Charles W. '82
- VT B** Salazar, Marcos Edward '82
- WI A** Frazier, Clive '66
- WI B** Erftmier, Roger Alan '63

\$1,000+ Downing Club

- AL A** Trapani, Karen Louise '82
- AL B** Slaughter, Charles Jeff '82
- AL G** Hamilton, George Seaton '89
- AZ B** Latta, David Raymond '89
- CA A** Bruemmer, Timothy Michael '84
Morihiro, Steve '79
- CA E** Robson, Clayton William '58
Hitz, Jerre Allen '58
Madni, Asad Mohamed '69
Suyematsu, Herbert Takashi '58
Welstand, Joseph Stephen '64
Lowe, William Warren '79
- CA G** Sturgeon, William Randall '70
- CA N** Jordan, Patrick Anthony '87
Newberry, Conrad Floyd '57
Stewart, Diana Frieda '83
- CA E** Schneider, Randolph Paul '71
- CO A** Chapman, Terry Charles '69
- CO B** Gustafson, Molly Burkholder '85
Walker, John Sherwood '53
Ton, Scott Marshall '74
- CO G** Baublitz, John Eberhart '60
- CT A** Kaufman, Earle Bertram '42
Douglass, Michael Richard '79
- CT B** Remondi, Benjamin William '67
- DC A** Wimberly, Mark Oliver '77
- DC B** Murphy, Joseph A. '60
- FL A** Higgins, Adam Steven '03
- GA A** Dishongh, Jefferson Lee '66
Parker, Jonathan Edward '59
- IL A** Schleicher, Kathy Louise '85
- IL B** Johnson, J. Randall '63
- IL G** Williams, Molly Wells '63
- IN A** Lupfer, Thomas Harrison '79
Stokes, Ronald Blaine '60

- IN A** Hartman, Richard Carl '63
- IA A** Cronk, John Otis '60
- IA B** Corrao, Debbie G. '93
- KS A** Hinton, Robert Allan '61
Anonymous '82
- KS G** Erickson, Larry Eugene '60
- KY A** Gardner, Timothy Alan '75
- KY B** Minsterl, James R. '71
- MD A** Kutcher Jr., John Francis '86
Kutcher, Susan Lynn '89
- MD B** Wamsley, Brian Woodrow '77
- MA A** Bernacki, Stephen Edward '70
Oakes, Michael Willard '77
Weeks, Frank Edward '46
- MA B** Denhard, William George '42
Klein, Harrison John '71
Patterson, John Bryan '68
Smith, Alan Jay '71
- MA A** Adams, Randolph Keith '70
Savage, Paul David '77
- MA E** Hayden, Thomas Lee '62
Ridlon, Stephen Allan '66
- MI G** Burkholder, Earl F. '73
Hammond, Donal Dwight '52
Sheets, Alan '81
- MI E** Brooks, Vern Eugene '60
- MI Z** Tarricone, Louis Guy '82
- MN A** Ball, William Lewis '70
Lapakko, Kim Alan '76
Brownfield, David Lee '68
Herman Jr., Donald Louis '84
Merz, Jeffrey B. '67
- MO A** Kyser, Dale Anthony '83
Sedovic, Pete Stephen '81
Shomber, Henry Rolan '78
- MO G** Courville, George Eugene '59
- MT A** Wigchert, Albert Henry '74
- NH B** Cloyd, Joseph R. '02
- NJ A** Schmidt, Arthur Joseph '68
- NJ B** Colarusso Jr., Remo John '83
- NJ G** Husson III, Matthew A. '66
- NM B** Donnelly, Carolyn Elaine '01
- NY B** Leader, Margaret Ellen '85
- NY G** Butler, Charles William '50
Levinson, Stanley H. '78
Lynch, Michael Francis '87
Philip, James Henry '69
Boyarsky, David '59
- NY A** Pawelko, Michael James '53
- NY E** Kern, Frank John '70
- NY H** Casper, David A. '88
- NY K** Notaro, Frank '57
- NY N** Byrnes, Richard Dennis '83
- NY O** Eggleston, Peter Anthony '81
- NY E** Davis, John Michael '73
- NC A** Wynegar, Kathleen M. '86
- NC G** Jackson, James Roy '69
- OH A** Ehlert, Donald Arthur '84
Kownacki, Edward Joseph '67
Oravec, Joan Marie '71
Smialek, Jim L. '68
- OH B** Robinette, Lisa Marie '03
Wood, Ronald Eugene '89
- OH G** Stumbaugh, Gary Allen '66
- OH E** Duscha, Rudolph Albert '59

- OH H** Lantier, Ward John '63
Schneider, Greg Richard '80
Wolfe, Stephen A. '85
- OH G** Brennan, Thomas J. '83
Doyle, James Thomas '65
- OH A** Krueger, Karl Hermann '73
- OH M** Dull, Daniel D. '90
- OK B** Strattan, Bob '58
- OR A** Sias, James Frederick '57
- PA A** Camana, Peter Carrell '71
Lynch, Sarah Hayward '89
Zahora, Kenneth Richard '76
- PA B** Cavalier III, Forrest Joseph '89
- PA G** Cavalier, Nina Leslie '89
Kuhr, Tina Michelle '81
- PA Z** Eisenberg, Eric Jay '88
- RI A** Mergel, Joseph John '72
- RI A** Kaplan, Kenneth J. '84
- RI B** Pezzutti, David August '69
- SC A** Silva, Ronald Ernest '74
- SC G** Drennan Jr., Robert Francis '70
Adkins Jr., Henry Grady '66
Baggett, Charlie Cleveland '63
Julich, Thomas Frank '76
- TN A** Burnett, William Allen '71
Kaminsky, Lawrence Victor '81
Sharp, Jason Wayne '02
- TN B** Heflinger, Richard Scott '72
Hodges Jr., Willie Erwin '67
Shireman, John Frederick '76
- TX A** Cardwell, John Wesley '68
Malins, Chester Joseph '76
Peet, Ed '69
Rusch, Stephen E. '84
- TX B** Baker Jr., Marvin Elroy '86
MacCallum, Gregory James '81
- TX G** Hagler, Marion Otho '63
- TX A** Massett, Donald Allen '70
Simpson, Stancy Jean '79
Smith, Manning DeWitt '64
- TX H** Bishop, Neil Erasmus '66
Godwin, Albert Eugene '84
Williams, Larry Donal '80
- TX G** Quesada, Paul '72
- TX A** Hinojosa, Juan Jose '84
Schultz Jr., Alvin Frederick '73
- VT A** Goddard, Eric Hapenny '86
Shatz, Jonathan Ary '82
Tietjen, Jill S. '76
- VA A** Nowotarski, Adam A. '91
- VA B** Oiye, Martin Yasuyuki '76
- WA A** Groat, J. Everett '94
- WA B** Lorkowski, Timothy Walter '93
- WI A** Holzman, Perry A. '85
- WI B** Kleinvehn, Lynn Allen '65
Jenn, David C. '75
Simon, Karen Anne '83

Ensuring the successful future of Tau Beta Pi is a family affair!



Development Contributors — Judy and Ron Pasadyn

Judy and Ron, P.E., *OH E '70*, were the first to endow a Professional Development Session for TBII Convention attendees in 2020. Thanks to their lead, Tau Bates continue to receive invaluable training for future professional success. In addition, Judy and Ron have also endowed a TBII Scholarship for chemical or biomedical engineering students at the Ohio Epsilon Chapter at Cleveland State University. Alumni contributions like this support collegiate chapters in continuing to do important work for student members, local communities, and for the engineering profession.



Heritage Society Members — Katy and Dirk Colbry

Katy Colbry, Ph.D., *MI A '99*, and Dirk Colbry, Ph.D., *MI A '06*, belong to a family that includes several members of TBII. While both work at Michigan State University, Katy as the Assistant Dean for Engineering Graduate Student Services, and Dirk as Director of graduate recruiting in the Computational Mathematics, Science & Engineering Department, they are both long-time volunteers with the Association. Katy serves as the Director of Engineering Futures while Dirk is a MI Alpha Chapter Advisor and Engineering Futures Facilitator. Katy has two brothers who are also Tau Bates: Tim & Mark Luchini.

Authors

Recently published a book? If so, we would like to recognize you! Send details and a cover image to dylan@tbp.org.

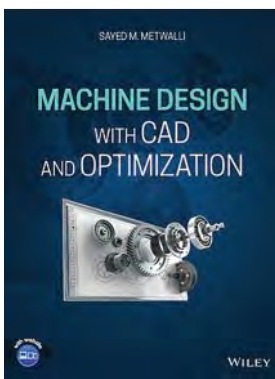


Dirk J. Colbry, Ph.D.
Michigan Alpha '06
Matrix Algebra with Computational Applications

Dirk authored this book, published by Michigan State University Libraries in 2021. It is a collection of Open Educational Resource materials designed to introduce students to the use of Linear Algebra to solve real-world problems. Dr. Colbry is director of graduate recruiting for the dept. of computational mathematics at MSU.

W. Roy Penney, Ph.D.
Arkansas Alpha '59
Computer-Aided Design of Fluid Mixing Equipment

The book, published in 2021 by Elsevier, is a guide and tool for practicing engineers to help in solving their agitation and mixing problems. The most appropriate design techniques are included in available computer programs for solving these problems. Dr. Penney is professor emeritus of ChE at the University of Arkansas.

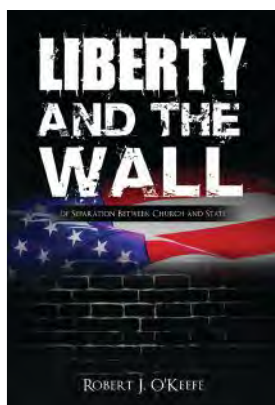
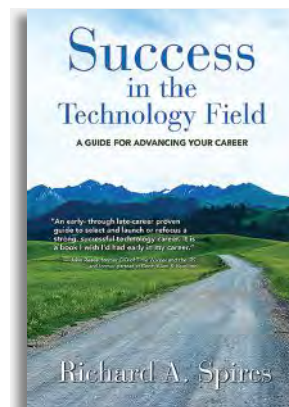


Sayed M. Metwalli, Ph.D.
Florida Delta '65
Machine Design with CAD and Optimization

Sayed is author of this guide to the new CAD and optimization tools and skills to generate real design synthesis of machine elements and systems. The book was published by Wiley in April 2021. Dr. Metwalli is professor emeritus at Cairo University in Egypt.

Richard A. Spires
Ohio Beta '84
Success in the Technology Field

Richard's book, published in 2021, presents a model incorporating the skills and behaviors to help attain your career goals. In addition to being a successful entrepreneur, he served as CIO of the IRS and U.S. Department of Homeland Security. He has a B.S. degree in electrical engineering from the University of Cincinnati.

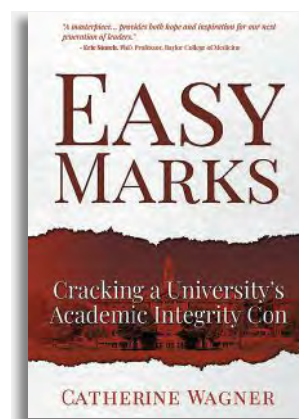


Robert J. O'Keefe
Indiana Alpha '80
Liberty and the Wall of Separation between Church and State

Robert published this, his second book, in 2021. The book steers clear of conventional controversies over religious symbols and speech on public property and in public institutions, and instead penetrates to the heart of the underlying conflicts of values and senses of the right, good, and just in matters of public interest.

Catherine Wagner
North Carolina Alpha '20
Easy Marks: Cracking a University's Academic Integrity Con

Catherine's debut book, published in 2021, chronicles her four-year journey from being falsely accused of cheating, to being exonerated, and discovering she was a subject in a clandestine research program. She graduated valedictorian in both chemical eng'g and Spanish language and literature and was a TBP chapter president.



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CHAPTER ETERNAL

Our fellow Tau Bates who are gone, but never forgotten.



Illinois Alpha '48

Arthur "Art" P. Bوسي, Ph.D., P.E.
February 15, 2021

Professor Emeritus at the University of Illinois at Urbana-Champaign and the University of Wyoming, known for his book, the first on the subject of vector analysis.

The condensed style of these notices is made necessary by the Association's large membership and space limitations in *The Bent*. You may contact the Editor for additional facts (if available) concerning the following deceased members. The assistance of all is earnestly sought in reporting the deaths of Tau Bates, including full name and date of death. You may report the death of a member by sending an email to chapter.eternal@tbp.org. Members that were 100+ years when passing are identified with "Cent."

ALABAMA

ALPHA AL A

Cooper, Arthur W., '39, Oct. 26, 2018. **Cent.**
Britt, Henry Solomon, '41, August 20, 1945.
Crow Jr., Earl A., '41, May 24, 1983.
Eiland Jr., Bolden Hall, '41, April 4, 1988.
Fisher, Martin H., '41, June 12, 1996.
Heard, Joe Mitchell, '41, October 28, 2018.
McCulloch, James Carlyle, '41, Feb. 4, 1997.
Mershon, Clarence Leroy, '41, Sept. 1, 2010.
Pettus, Sam James, '41, January 8, 1961.
Windham, James Robert, '41, Jan. 6, 2006.
Baker, Holdman William, '42, Sept. 26, 1997.
Burgin, Ernest C., '42, November 9, 2008.
Carter Jr., H. Gray, '42, December 31, 2006.
Diegel Jr., Archie W., '42, February 21, 1998.
Dodd Jr., Asa Leonard, '42, June 22, 1990.
Duke, Russell Alexander, '42, Dec. 24, 2011.
Rouse Jr., James Lucas, '42, Feb. 28, 2016.
Thigpen, Lane Fitzgerald, '42, Jan. 27, 2005.
Young, Ronald Douglas, '42, August 10, 2002.
Clinton, William Robert, '43, Dec. 30, 2017.
Corley, Tom Edward, '43, June 9, 2017.
Donovan, William H., '43, March 3, 2010.
Flinn Jr., James Lindley, '43, Nov. 2, 2008.
Girardeau, Julian Merrill, '43, June 9, 2007.
Griffith, McMurray Logan, '43, Sept. 6, 2017.
Haraway, Robert Cyrus, '43, March 27, 2001.
Hicks, Victor Carl, '43, December 13, 1996.
Richter, William Cooper, '43, Nov. 8, 2013.
Samuel, William L., '43, May 9, 2006.
Styring Jr., Ralph Edgar, '43, Jan. 13, 2018.
Weisz, Warren Harding, '43, Oct. 25, 1996.
Wells, Albert Norman, '43, Dec. 3, 2013.
Blake, John Wyche, '44, November 12, 2019.
Brush, John Elliot, '44, February 26, 2017.
Conn, Harold Coleman, '44, January 7, 1995.
Eskew Jr., Milner Hubbard, '44, Oct. 23, 2011.
Frazer, Benjamin C., '44, June 23, 2010.
Mitchell, Elias C.D., '44, April 9, 2010.
Nielsen Jr., Knud, '44, October 16, 2015.
Stone, Willis Walton, '44, February 15, 2020.
Cox, Julius G., '48, May 18, 2021.
Vanwanderham, Marvin C., '58, Jan. 4, 2011.
Straiton, Robert Louis, '61, no details.
Stricklin, Robert Edward, '71, Aug. 4, 2007.
Dodd, James Barcroft, '77, August 16, 2020.

BETA AL B

Starkey, Edward W., '43, December 5, 2012.
Wisneski, Peter Michael, '43, Feb. 23, 2002.
Wallace, Winston Leon, '49, July 27, 2016.
Hyman, Normand, '53, February 28, 2002.
Nutting Jr., Norwood V.C., '61, May 18, 2007.
Owen, William Harold, '66, Dec. 25, 2020.
Neergaard, John R., '67, July 16, 2020.
Bates, Philip Edward, '68, June 9, 2008.
Turner Jr., Charlie Daniel, '71, Oct. 22, 2005.
Salsman, Johanna Leah, '85, Sept. 12, 2004.

GAMMA AL Γ

Farlow, Carl Pearson, '43, January 31, 2006.

ARIZONA

ALPHA AZ A

Okuma, Ikuo, '41, March 12, 2011.
Ellsworth, Grant Ronald, '43, Jan. 7, 2014.
Ince, Simon, '43, August 15, 2020.
Hill, Ernest Herschel, '50, Nov. 19, 2008.
Fujii, Shoji, '57, May 26, 2001.

BETA AZ B

Elsner, Ralph William, '43, January 25, 2012.
Brown, Thomas Samuel, '65, Sept. 21, 2013.
Wilcox, Milton Ernest, '69, March 28, 2010.

ARKANSAS

ALPHA AR A

Arnold, Hendrick Jackson, '41, Dec. 17, 1987.
Carlson, Eugene Cedric, '41, Dec. 8, 1975.
Oxford, Charles William, '44, Aug. 16, 2005.
Lewis, Thomas Eugene, '52, April 14, 2010.

CALIFORNIA

ALPHA CA A

Richards, Gordon V., '37, June 16, 2015. **Cent.**
Bromley, Leroy Alton, '41, February 24, 2004.
Kaste, Victor Ensio, '41, July 27, 2001.
Prud'Homme, Earle S., '41, June 12, 2003.
Rintoul, John David, '41, Sept. 13, 2013.
Savage, William Winther, '41, no details.
Christensen, Oren Lee, '43, Dec. 4, 2012.
Sanderson, Austin Orbin, '43, April 9, 2012.
Lynch, Edward Joseph, '44, October 30, 1975.
Rubesin, Morris William, '44, Sept. 11, 2011.
Notthoff Jr., Arthur Paul, '45, Jan. 26, 2017.
Saenger, David Mangold, '45, July 9, 2007.
Stuelpnagel, Thomas R., '45, Oct. 22, 2012.
Vaum, Howard Thomas, '45, June 25, 2019.
Zinola, Edward Peter, '45, July 20, 2013.
Comstock, Richard L., '56, October 17, 2011.
Tong, Gregory, '76, November 8, 2016.

BETA CA B

Partlow, John Graydon, '41, August 24, 2001.
Jephcott, Donald K., '42, April 18, 2016.
Whitney, William Merrill, '51, no details.

GAMMA CA Γ

Mihran, Theodore Gregory, '44, Oct. 9, 2016.
Raven Jr., Robert S., '46, Sept. 12, 2014.
Fuller, Robert Osborne, '51, Dec. 9, 2020.
Carrell, Sam Less, '58, no details.
Deckel, Walter Alten, '77, no details.

DELTA CA Δ

Duell, Lowell F. W., '42, December 8, 2012.
Reames, James Richard, '56, no details.

EPSILON CA Ε

McGrew, Thomas Allen, '50, Sept. 1, 2013.

ETA CA Η

Blight, Robert Scott, '03, June 8, 2008.

THETA CA Θ

Rigby, John Edwin, '62, November 22, 2009.
Langevin, Edward Francis, '66, no details.
Cook, John Richard, '76, no details.
Keilty, Catherine Anne, '81, May 25, 2008.

IOTA CA Ι

Cromwell, Leslie, '43, June 15, 2010.
Prohias, Vicente Ernesto, '70, Sept. 8, 2019.

LAMBDA CA Λ

Samaan, Mourad Moni, '86, August 13, 2011.

OMICRON CA Ο

Rowlands, Basil Owen, '72, no details.

PI CA Π

Pate, Walter Harry, '70, August 30, 2010.

COLORADO

ALPHA CO A

Garrett, Howard Lee, '49, August 29, 2016.
Parker Jr., Ben Hutchinson, '49, no details.
Kassens, Clarence Lee, '51, Nov. 29, 2020.
Bingel, James Richard, '53, May 14, 2018.

BETA CO B

Boyd Jr., Berlin, '41, August 20, 2001.
Pietenpol, William John, '43, Nov. 14, 2020.
Bardwell, George Eldred, '44, June 22, 2009.
Cladis, John Baros, '44, September 12, 2019.
Twombly, John Carl, '44, December 9, 2016.
Kreith, Frank, '45, January 8, 2018.
Looper, Joseph Henry, '45, January 9, 2011.
Maler, George Joseph, '45, March 16, 2018.
Beach, Byron C., '47, November 26, 2010.
Johnston, David King, '47, July 21, 2007.
Gyger, Cecil Everett, '48, July 3, 2002.
Schaefer, Irving Otto, '56, no details.
Seely, Alan Leroy, '61, March 11, 2005.
Baily, Carl Griffith, '65, no details.
Berg, Gerald Edward, '73, June 29, 2012.
Pearsall, Brian Allen, '80, June 8, 2001.
Hadden, Tracy Glen, '83, no details.

CONNECTICUT

ALPHA CT A

Hovis Jr., Robert Lee, '41, no details.
Hughes Jr., Douglas William, '48, no details.
Eskridge, Robert Thomas, '51, Jan. 16, 2019.

BETA CT B

Handy, Richard Arthur, '48, May 8, 2020.
Yocher, Harold Charles, '68, Dec. 24, 2006.

DELAWARE

ALPHA DE A

Locke, David Walter, '43, January 5, 2013.
Edelberg, Nathan, '49, May 30, 2020.
Walton, Eric Keller, '66, June 25, 2020.

DISTRICT OF COLUMBIA

ALPHA DC A

Florant, Leroy Fredric, '43, Sept. 6, 2019.
Scipio II, L. Albert, '48, October 27, 2014.

BETA DC B

Stefurak, Mark Lawrence, '66, no details.

FLORIDA**ALPHA FL A**

Simpson, R. Bruce, '50, October 10, 2019.
Wiggins, Macdonald J., '52, Jan. 30, 2000.
Zepp, Stanley Richard, '61, October 5, 2012.
Carrera, Louis Carlos, '64, March 29, 2012.
Greene, I. Joe, '73, June 24, 2020.
MacRae, Stuart Wyatt, '79, no details.
Kreher, Stephen Charles, '84, Aug. 8, 2000.

BETA FL B

Martinez, Aristides, '64, October 6, 2013.
Fernandez, Miguel A., '66, no details.
Sobrino, Jose Antonio, '66, Nov. 10, 2013.

DELTA FL A

Osborne, Deborah Marie, '97, Aug. 8, 2006.

ZETA FL Z

Lucosun, David Bruce, '01, May 15, 2013.

GEORGIA**ALPHA GA A**

McGough, Wilson Newton, '40, July 8, 2007.
Haskell, Blanton Winship, '42, May 23, 2003.
Borup, Byron Lee, '46, July 19, 2009.
Doyle, Vincent Jerome, '48, Feb. 12, 2008.
Henderson Jr., Arthur, '48, Nov. 19, 2011.
Schindler, Martin Harold, '48, Oct. 26, 2016.
Shore, James B., '49, May 24, 2005.
Bolton, William Rogers, '50, May 28, 2002.
Henderson, Ulysses Virgil, '50, Aug. 14, 2018.
Scott, Edwin Lee, '50, January 2, 2019.
Turner, William Earl, '51, October 16, 2006.
McMahon, Robert Edward, '52, July 6, 2005.
Bulloch, Ben Hill, '53, June 30, 2016.
Hoskins, James Martin, '54, no details.
Wells, Louis Cecil, '54, October 18, 2009.
Hill, Kendall Wayne, '56, June 3, 2011.
Morris, Guy Vernon, '58, no details.
Abeling, Arthur Bernard, '59, Jan. 15, 2007.
Byrd Jr., John Blackwell, '61, no details.
Herbert III, Walter R., '61, March 25, 2021.
Kohl, Robert Edson, '65, June 2, 2003.
Crossley, Robert William, '67, no details.
Drexinger, Bernard Richard, '82, no details.
Wilson, Carlton M., '86, March 27, 2009.

ILLINOIS**ALPHA IL A**

Janney, Clinton Dales, '41, Nov. 1, 1992.
Fowler, Charles Albert, '42, Nov. 7, 2016.
Boresi, Arthur Peter, '48, February 15, 2021.
Chirtel, Joseph Samuel, '48, Jan. 11, 2019.
Bringman, Donald Burt, '50, June 20, 2008.
Melin, Carl Julbert, '50, no details.
Probst, Richard Otto, '51, October 7, 2008.
Toppmeyer, Robert B., '51, January 25, 2002.
Wesselink, Robert Duane, '54, Sept. 17, 2017.
Faster, Walter W., '55, July 26, 2015.
Kuchenbecker, Richard A., '57, no details.
Schwiebert, Phillip D., '61, April 22, 2012.

BETA IL B

Spielman, Maurice, '45, November 7, 2018.
Laurinec, Jerome Joseph, '49, Sept. 16, 2011.

GAMMA IL Γ

Hopp, John Frederick, '44, no details.
Howerton, Robert J., '46, Dec. 29, 2002.
Sharpe, Charles Bruce, '46, Sept. 10, 2004.
Watson, John Ward, '47, January 12, 2011.
Gillengerten, Lawrence Peter, '48, no details.
Randall, Richard Arthur, '49, Oct. 18, 2017.
Fox, Herbert Charles, '50, July 2, 2005.
Anderson, Robert James, '52, Jan. 26, 2002.
Bryan, Jon Jasper, '61, February 8, 2021.

INDIANA**ALPHA IN A**

Toy, Frank C., '39, February 2, 2020. **Cent.**
Wist, Henry Paul, '41, May 29, 2006.
Chrisman, Donald Wray, '42, July 14, 2020.
Youkey, Robert Vincent, '42, July 12, 2003.
Hayes, Richard Lloyd, '43, April 21, 2002.
MacQueene, Paul Hurd, '43, April 29, 2005.
Hesse, Walter John, '44, February 22, 2009.
Jansen, Emmert Tobias, '46, Jan. 19, 2001.
Zagnoli, Sinesio A., '47, January 4, 2006.
Batug, Frank J., '48, no details.
Spotts, George Robert, '48, October 21, 2004.
Jex, Earl Charles, '49, August 17, 2005.
Stuehrk, Carl Francis, '49, March 19, 2020.
Amiss, James Robert, '50, Dec. 14, 2000.
Cartmell Jr., Bernard C., '50, June 29, 2007.
Harrison, Norman C., '50, April 10, 2009.
Konrad, Robert John, '50, April 6, 2021.
Michel, Ross Owen, '50, March 21, 2003.
Turner, James William, '50, January 11, 2001.
Eggmon, Max Earl, '51, March 7, 2008.
Graham, James William, '51, no details.
Hendricks, Richard Allan, '51, May 11, 2015.
Donahue, John Lewis, '52, no details.
Talcott, Thomas Dale, '52, June 2, 2003.
Baumeister, Ernest B., '56, Dec. 19, 2011.
Hutson, Donald E., '57, no details.
Bundy, Roy Dale, '58, August 29, 2001.
Egbert Jr., George L., '58, Sept. 11, 2012.
Johnstone, Norman J., '58, no details.
Pluntz, Richard Vance, '58, no details.
Hruska, Samuel Joseph, '59, April 25, 2006.
Reeder, John Albert, '59, no details.
Smalley Jr., George L., '61, August 26, 2011.
Carlson, Paul Theodore, '65, Nov. 22, 2009.
Bratkovich, Alan Wayne, '73, no details.
Turner, Larry William, '76, August 27, 2006.
Bartick, Andrew Keiner, '91, July 31, 2002.

GAMMA IN Γ

Sullivan, Daniel David, '62, July 27, 2011.

IOWA**ALPHA IA A**

Blean, Harold Paul, '40, September 16, 2017.
Welton, Herbert Addison, '41, Oct. 8, 2014.
Wentz, John B., '41, July 2, 2003.
Chamberlain Jr., Philip M., '43, Feb. 10, 2014.
Newhouse, Paul Dean, '43, Dec. 2, 2007.
Anderson, Arnold W., '47, June 27, 2018.
Carlson, Willard Emmet, '47, Feb. 17, 2005.
Rapp, Glen LaMar, '48, September 6, 2020.
Berka, Jack Stair, '49, December 24, 2020.
Dolph, James Lewis, '50, no details.
Stilley, George Donald, '50, April 17, 2010.
Chapman, Jesse Dwayne, '52, Jan. 24, 2021.
Wiser, Edward H., '53, March 4, 2010.
Branscom, Glenn Allen, '55, Oct. 31, 2017.
Dunn, Dennis Wayne, '61, January 5, 2002.
Johnson, Robert Wallace, '61, July 15, 2013.
Hungerford, Charles William, '64, no details.

BETA IA B

Poulter, Joseph C., '49, September 11, 2005.
Smull, William E., '50, August 26, 2003.
Bailey, Miles Hugh, '72, February 5, 2013.

KANSAS**ALPHA KS A**

Kanaga, William Smith, '45, July 21, 2019.
Spencer, Chester Wallace, '49, Jan. 7, 2021.
Coyle, Donald Gerald, '58, October 1, 2008.
Houghton, Lawrence E., '73, July 24, 2005.

BETA KS B

Stafford, Harold LeRoy, '67, June 4, 2019.

GAMMA KS Γ

Wendling, Leo Theodore, '47, no details.

KENTUCKY**ALPHA KY A**

Albert, Edward Vernon, '41, Nov. 26, 1997.
Gaines Jr., Robert Usher, '41, March 4, 2000.
Hopper, Dwight Lee, '42, February 25, 2002.
Nitzschke, Joseph Donald, '42, Sept. 9, 1997.
Vance, Donald K., '58, June 2, 2021.
McGoldrick, Gilbert A., '71, October 22, 2011.
Ries, Harry J., '71, January 9, 2005.

BETA KY B

Higgins, George Bernard, '42, no details.

LOUISIANA**ALPHA LA A**

Causey Jr., Andrew J., '49, August 29, 2020.
Peloubet Jr., Raymond P., '49, Feb. 8, 2013.
Timpner, William Frenz, '49, Oct. 19, 2019.
Enem, Bongo C., '79, no details.

BETA LA B

Bailey, Raymond Victor, '44, August 17, 2006.
White Sr., Warren Nichols, '45, Oct. 7, 2004.
Gumnick, Karl Francis, '50, no details.
Remond, Frank X., '53, October 21, 2001.
Weaver, Robert Edgar, '53, no details.
Smythe Jr., Arnold R., '58, Feb. 23, 2010.
White Jr., Warren N., '74, May 24, 2021.

GAMMA LA Γ

Brown, Jacob Richard, '57, January 16, 2013.

MAINE**ALPHA ME A**

Alford, Wilson Merriman, '41, Feb. 28, 2012.
Burton, Blendin LeRoy, '41, Nov. 8, 1999.
Chase, Richard Raymond, '41, Oct. 23, 2004.
Condon, James Stevens, '41, Jan. 21, 1987.
Cotton, George Benjamin, '41, Oct. 17, 2004.
Crosby, Howard Alvah, '43, August 25, 2007.
Moulton, Roger D., '43, December 10, 2016.
Pease, George Marshall, '43, Oct. 14, 2015.
Schofield Jr., Wentworth H., '43, Aug. 21, 2008.
Bickford, William Joseph, '44, May 30, 2017.
Ford Jr., William Blanchard, '44, no details.
Small, Howard Edwin, '50, Dec. 1, 2003.
Merrill, Richard Cardey, '57, March 9, 2009.
Ralph Jr., Albert Henry, '59, August 3, 2010.

MARYLAND**ALPHA MD A**

Kovaszny, Leslie S-G, '41, April 17, 1980.
Li, Wen-Hsiung, '41, September 13, 2002.
Benton, George Stock, '42, no details.
Muller, Richard Shappell, '43, Jan. 11, 2020.
Dzimianski, John William, '47, July 17, 2019.
Beard Jr., Harry Burgess, '48, May 27, 2014.
Gore, Willis Carroll, '48, May 29, 2015.
Winter, George William, '48, June 12, 2021.
Ball Jr., Wilmot C., '49, October 12, 2013.
Frankle, Jerome Martin, '49, June 26, 2008.
Brokaw, Robert William, '50, April 13, 2018.
Coxe, Michael P. M., '59, May 25, 2021.

BETA MD B

Weeks, Loraine Hubert, '40, Dec. 25, 2002.
Watson Jr., Thomas E., '41, July 30, 2009.
Cardegna, Felix F.J., '43, October 23, 2009.
Currin, Clifton Bradford, '43, Feb. 2, 2018.
Kabik, Irving, '43, August 12, 2018.
Kent, Richard Henry, '43, no details.
Moyer, Carson Franklin, '43, January 9, 2016.
Sheridan, Hugo Grotius, '43, no details.
Tucker, John Bonar, '43, March 14, 1993.
Engle, James David, '44, January 10, 2010.
Stuntz, John Walter, '44, June 20, 2019.
Cournyn, John Burton, '46, no details.

CHAPTER ETERNAL

Continued



Massachusetts Alpha '93

Shira A. McWaters, P.E.

June 19, 2021

Since 2016, she was the City of Oak Ridge, TN, Public Works Director responsible for the city's essential infrastructure and earned a B.S. from Worcester Poly. Inst.

BETA MD B

Trautner, Carl A., '50, May 26, 2011.
Brzozowski, William, '57, no details.

MASSACHUSETTS

ALPHA MA A

Hainsworth, Bruce D., '44, March 12, 2020.
Grogan, William Robert, '45, May 12, 2015.
Landers, John Joseph, '46, Nov. 23, 2004.
Paris, Ronald Bertrand, '46, June 30, 2007.
Koontz, Carl Henry, '48, May 13, 2009.
Kulin, Gershon, '48, February 24, 2016.
Freeland, Andrew Frederick, '51, no details.
Wye, Roger Edwin, '51, December 21, 2019.
McWaters, Shira Ann, '93, June 19, 2021.

BETA MA B

Cadogan, William, '41, March 31, 2018.
Meier, John Woerz, '41, June 7, 2016.
Mueller, Carl Muth, '41, March 21, 2021.
McDonough Jr., John W., '43, Dec. 3, 2011.
Neel, Robert Irvine, '44, no details.
Brylawski, Edward Fulton, '46, June 5, 2017.
Reals, Willis Braithwaite, '47, April 13, 2020.
Rosenberg, Edwin Arthur, '47, May 25, 2019.
Sterling Jr., Arlie Graham, '48, Feb. 12, 2020.
Fairfield Jr., John, '49, July 15, 2008.
Piness Jr., George, '49, no details.
Fleming Jr., Joseph D., '50, Jan. 17, 2003.
Lea, Donald Clarke, '50, February 26, 2008.
Koch, Eugene E., '51, August 7, 2003.
Bacastow, Robert Bruce, '52, March 8, 2007.
Heitman, Richard Edgar, '52, July 5, 2003.
Newcomer, Waldo, '52, April 11, 2001.
Richter, Eugene Davies, '53, Sept. 28, 2003.
Lyke, Richard Edwin, '54, January 22, 2001.
Serman, Irwin Isadore, '56, Dec. 22, 2015.
Overstreet, William Earl, '59, July 13, 2004.
Gladding, Dale Gordon, '62, October 8, 2007.
Mathias, Siegfried, '72, no details.

DELTA MA Δ

Agar Jr., Robert Kinsley, '44, no details.
Dickson, Arthur Webber, '46, Aug. 20, 2005.
Ladet, Thomas James, '50, Sept. 17, 2020.
Beadle, Charles Wilson, '51, March 7, 2016.
Hautaniemi, Bruno W., '51, March 12, 2003.
Brandli, Henry William, '59, Sept. 26, 2007.

EPSILON MA E

Eigner, Harry, '47, August 6, 2017.
Sviokla Jr., Sylvester C., '47, August 25, 2010.
Shames, Irving Herman, '48, June 30, 2010.
Condon, Gregory W., '65, March 23, 2021.
Madore, Jeffrey Richard, '84, August 8, 2016.

ZETA MA Z

Hopfe, Harold Herbert, '58, January 30, 2004.
Mayeros, William Edward, '59, Nov. 19, 2020.
Poshkus, Gerald Michael, '68, Nov. 28, 2019.

ETA MA H

Chen, Ming M., '41, August 12, 2003.
Hsu, Pao Tan, '42, no details.
Nickerson, John Harvey, '72, no details.

MICHIGAN

ALPHA MI A

Morton, James Henry, '50, May 5, 2021.

BETA MI B

Minne, Gerald Martin, '41, January 29, 2000.
Kincaid, Norman Lawrence, '48, no details.
Hakala, Oiva W., '49, September 23, 2013.
Veselik, Charles Frank, '56, Dec. 7, 2001.
Wiersema, Ronald Gene, '57, Feb. 6, 2021.
Goodrich, George M., '63, April 20, 2021.
Nabbefeld, Norman Clifford, '66, no details.

GAMMA MI Γ

Heddle, Frederick Andrew, '41, no details.
Stumpf, Gordon Albert, '41, no details.
Wilson, Walter Raymond, '41, Jan. 20, 2007.
Lee, Joseph Onne, '42, no details.
Berman, Herbert, '43, April 14, 2004.
Hamme, Richard Nelson, '47, no details.
McKee, Donald Monroe, '47, Nov. 2, 2019.
Fiteny, Louis Michael, '48, March 30, 2004.
Gebhart, Benjamin I., '48, October 18, 2009.
Healy Jr., William C., '48, June 28, 2003.
Aprill Jr., Theophil, '51, April 23, 2008.
Lind, Dean Norman, '53, December 15, 2010.
Hogan, Philip Andrew, '54, June 2, 2017.
Mazur, Joseph Casmere, '54, no details.
Boice, David Geer, '55, February 11, 2001.
Harlan, John M., '56, May 22, 2021.
Alexander, George Wilbur, '57, Feb. 23, 2000.
Daws Jr., James Lyle, '59, no details.
Karnopp, Bruce Harvey, '60, January 1, 2017.
Nye, Gary Kempton, '65, May 13, 2008.
Decker, Frank Fredrick, '68, no details.
Baines, Thomas Munn, '75, March 8, 2000.

DELTA MI Δ

Hamilton, James Lee, '52, January 12, 2021.
Vethacke, Theodore Clemens, '59, no details.
Tambyln, Thomas A., '63, no details.
Chmielewski, Thaddeus E., '64, Oct. 20, 2000.

EPSILON MI E

Semchysen, Marion M., '41, no details.
Alderson, William Stratton, '43, Dec. 9, 2016.
Barnes, Harvey Lea, '57, no details.
Wonser, Carl E., '69, March 31, 2000.
Oh, Joon-Sup, '73, March 31, 2011.
Iannucci, Frank Joseph, '86, no details.

ZETA MI Z

Kurz, Landis Stephen, '50, June 3, 2004.

ETA MI H

Kilikevicius, Jeffrey Victor, '88, Feb. 4, 2005.

MINNESOTA

ALPHA MN A

Booth, Russell Nevitt, '49, Sept. 15, 2003.
Japs, Clifford Clarence, '49, March 31, 2011.
Wexler, Charles Harold, '49, Jan. 30, 2009.
Thorson, Keith Rodney, '51, Feb. 10, 2021.
Bruzek, James Michael, '53, no details.
Sunderman, Richard Paul, '61, Dec. 27, 2020.

MISSISSIPPI

ALPHA MS A

Black, William Thomas, '41, April 12, 2001.
Pettis, Ernest Wordlaw, '43, no details.
Stigler, Henry Walton, '48, Feb. 17, 2020.
Boggs Jr., Isaac Escro, '49, no details.
Cobb, William Andrew, '49, Feb. 24, 2010.

Campbell, William Bowles, '50, April 1, 2021.
Davis, Arthur Gerald, '59, April 29, 2019.
Palmer, Cecil E., '59, May 7, 2011.
Willis, Joe Clarence, '60, February 19, 2018.
Cochran, Donald Ernest, '78, August 7, 2011.

BETA MS B

Beck, Ardie Lavon, '71, no details.

MISSOURI

ALPHA MO A

Koch, Howard Frederic, '42, Feb. 28, 2019.
Dippold, Robert Andrew, '47, Jan. 15, 2005.
Bensiek, William Frederick, '55, Aug. 2, 2020.
Helms, Steven Joseph, '79, Dec. 21, 2007.

BETA MO B

Brackbill, Robert M., '42, May 15, 2020. **Cent.**
Corbett, John Edward, '48, Feb. 24, 2017.
Hogan, William Sanford, '49, March 26, 2001.
Dehekker, Lloyd T., '50, March 25, 2006.
Knauel, Edward Reinhold, '52, April 28, 2001.
Weddle Jr., Curtis Eugene, '55, Jan. 29, 2005.
Link, Donald August, '58, June 22, 2006.
Dare, Charles Ernest, '62, October 27, 2014.
Iraola, Gustavo Leopoldo, '66, Jan. 28, 2014.
McCaw Jr., Donald W., '67, October 4, 2005.

GAMMA MO Γ

Lindenmann, Robert P., '43, August 27, 2003.
Wallace Jr., Leland Morris, '43, Aug. 14, 2007.
Diboll Jr., Wallace B., '44, May 7, 2021.
Holeman, Marion Rufus, '48, no details.
Wilson, Edward Newton, '48, July 6, 2015.
Dye, Jack Edward, '49, March 3, 2005.
Wilkat, Albert O., '49, May 4, 2020.
Chervitz, Norton, '53, July 29, 2019.
Kolde, Richard Alan, '68, November 22, 2010.

MONTANA

ALPHA MT A

Carlson, Martin Walter, '43, Sept. 23, 2003.
Craig, Robert A., '49, no details.
Porter, John Howard, '50, December 2, 2020.
Bohannon, Billy, '60, November 23, 2002.
Vaughan, Robert Allen, '68, April 16, 2012.

NEW HAMPSHIRE

ALPHA NH A

Brown, Ralph Adams, '47, July 15, 2016.
Hawke, John Aloyeiuis, '47, Sept. 17, 2004.
Maloney Jr., Lawrence R., '57, no details.
Taatjes, Robert Donald, '59, April 12, 2018.

NEW JERSEY

ALPHA NJ A

Shay, George Clinton, '44, Sept. 30, 2020.
Kronauer, Richard Ernest, '45, Oct. 18, 2019.
Goodfriend, Lewis Stone, '47, July 30, 2018.
Searle, Richard Herbert, '49, no details.
Reyle, Stanley P., '53, August 9, 2016.

BETA NJ B

Gutwein, Joseph Michael, '58, no details.
Pascoe, Robert J., '64, November 9, 2010.
Audesirk, John Pringle, '68, Nov. 10, 2011.
Ducoat, Raymond Joseph, '01, Nov. 20, 2009.

GAMMA NJ Γ

Kliminski, Paul J., '50, no details.

GAMMA NJ I

Petrone, Ettore Tony, '52, March 7, 2020.
Lombardi, Crispiano Ernst, '53, Dec. 5, 2020.
Pompliano, Louis Dennis, '53, Feb. 1, 2002.
Clements, Wayne Irwin, '57, June 20, 2012.
Sullivan, John Joseph, '73, October 27, 2006.
Mullgrav Jr., Allan Leslie, '79, May 9, 2018.

DELTA NJ Δ

Rhoades, Theodore Charles, '48, Oct. 6, 2019.
Deveaux, Donald Richard, '49, June 24, 2009.

NEW MEXICO**ALPHA NM A**

Eakman, James Milton, '60, October 9, 2003.

BETA NM B

Naillon, Jack Joseph, '99, April 14, 2011.

NEW YORK**ALPHA NY A**

Diczok, Stephen, '42, June 8, 2006.
Leary, Robert Frederick, '42, July 14, 2001.
Devries, Frederick W., '50, Sept. 14, 2018.

BETA NY B

Roland, John James, '42, July 18, 2006.
Roy, Robert Joseph, '43, January 31, 2016.
Curtis, Harold Bacon, '49, February 23, 2020.
Duell, Charles Henry, '49, no details.
Storz, John, '51, December 26, 2011.
Suttenberg, Stewart, '52, May 7, 2020.
Strait, Bradley Justus, '58, May 6, 2021.

GAMMA NY I

Smith Jr., Joseph Henry, '46, August 5, 2002.
Barth, John Edward, '47, Nov. 26, 2020.
Rice, Joseph Albert, '48, January 8, 2018.
Ruede, Robert Charles, '49, no details.
Maliga, Joseph S., '51, August 3, 2005.
Guman, William John, '52, no details.
Loveland, Richard S., '52, April 10, 2001.
Sabatt, John Frank, '52, no details.
Levatich, Julius L., '55, May 14, 2014.
Costello, James F., '60, June 30, 2008.
Dinin, Steven Robert, '65, no details.
Sanderow, Howard I., '66, February 2, 2009.
Boody Jr., Frederick P., '71, April 12, 2007.
Chmielewski, Theodore W., '77, Dec. 5, 2016.

DELTA NY Δ

Swallow, George Leonard, '43, Oct. 9, 2009.
Thayer, Roger Eugene, '49, October 11, 2016.
Matyas, Robert M., '52, May 9, 2021.
Pope, Daniel L., '53, January 14, 2021.
Lutz, John Robson, '64, July 22, 2020.
Blau, Robert E., '67, February 10, 2021.
Tanenbaum, Stephen Lee, '70, Feb. 11, 2011.
Tadjigoueu, Etienne, '72, September 6, 2002.

EPSILON NY E

Dugundji, John Basil, '44, Dec. 20, 2020.
Farb, Daniel, '44, no details.
Baker, Donald H., '54, November 25, 2002.
Zachariou, Harry, '56, no details.
Hanks, Richard Albert, '57, June 6, 2005.
Holskin, Leonard, '58, March 11, 2000.

ZETA NY Z

Weiser, Sidney, '41, February 6, 2010.
Soehngen, Henry F., '43, no details.
Laemmel, Arthur Ernest, '44, no details.
Winklehaus, Charles, '51, August 8, 2019.
Lederman, Peter B., '53, June 9, 2020.

ETA NY H

Epstein, David John, '42, November 24, 2015.
Nashman, Alvin Eli, '48, no details.
Landerer, Hugo, '50, May 2, 2010.
Rappoport, Jacob Fishel, '50, Sept. 27, 2003.
Goldstein, Alvin Bee, '51, May 13, 2001.
Shapiro, Leonard, '52, December 17, 2011.

Grava, Sigurd, '55, September 14, 2009.

Mendelson, Sol, '55, October 6, 2010.
Reitz, Edward Stanley, '57, May 14, 2013.

Furiya, George, '64, no details.

Schrage, Irwin, '64, no details.

Ventriglio, Frank Joseph, '64, Aug. 18, 2017.

Dobkewitch, Stanley J.M., '73, Aug. 6, 2011.

THETA NY Θ

Diezemann, Gustav Alfred, '48, Oct. 30, 2019.

IOTA NY I

Glaser, Edmund M., '49, May 16, 2019.

LAMBDA NY Λ

Carney, William Vincent, '58, June 28, 2020.

Cipollone, Peter, '62, no details.

Jairam, Bhowdashur, '76, no details.

NU NY N

Brundage, Alan Frank, '79, August 5, 2000.

XI NY Ξ

Farrelly, Richard Joseph, '53, March 24, 2007.

Dunne Jr., James F., '74, March 24, 2009.

RHO NY Ρ

Mikochik, Stephen Thomas, '46, Jan. 1, 2016.

NORTH CAROLINA**ALPHA NC A**

Bodenheimer, Vernon Broadus, '48, no details.

Moore, John Sult, '49, August 6, 2006.

Steele, Henry Livingston, '57, July 24, 2007.

Doss, Michael Wayne, '66, March 8, 2007.

Orr, John Thomas, '73, no details.

GAMMA NC Γ

Wood Jr., Clarence Robert, '48, Aug. 23, 2019.

Trippel, Gerald Edward, '50, March 15, 2000.

Simon, Joseph Stephen, '65, July 8, 2009.

NORTH DAKOTA**ALPHA ND A**

Hoistad, John Gerald, '55, no details.

Neumann, William John, '58, Sept. 26, 2007.

McFarland, David L., '66, November 13, 2004.

BETA ND B

Perkuhn, Gaylen L., '78, October 7, 2012.

OHIO**ALPHA OH A**

Schrenk Jr., William J., '43, Jan. 23, 2021.

Strauss, Donald, '56, May 24, 2021.

Huth, Bernard Gene, '63, Dec. 30, 2018.

BETA OH B

Hahn, Robert S., '40, January 5, 2021. **Cent.**

Apgar, Ross Edward, '49, November 5, 2001.

Bankovskis, John, '64, no details.

GAMMA OH Γ

Bangert Jr., Charles A., '41, Nov. 18, 2011.

Mercer, Kenneth K., '43, April 5, 2011.

Sines, George Henry, '43, March 14, 2014.

Sayers, William Yates, '49, no details.

Bowser, Philip Crawford, '50, Jan. 4, 2007.

Graves, William Howe, '50, April 19, 2008.

Denzer, Richard Earl, '51, Dec. 26, 2016.

Krenek, George William, '51, Aug. 25, 2008.

Johnson, Robert Ernest, '52, no details.

Schauwecker, Harry Erich, '52, Jan. 18, 2021.

Richards Jr., Jesse Clement, '55, no details.

Rausch, Doyle W., '61, June 1, 2021.

DELTA OH Δ

Gamble, Edward Holland, '41, May 24, 1976.

Lawson, Lloyd Arelando, '51, Sept. 7, 2020.

Hutson, Joel Edward, '57, April 28, 2002.

Hild Jr., Wilbur Henry, '64, Nov. 16, 2000.

Clark, George F., '66, no details.

EPSILON OH E

Handke, Kenneth Elmer, '50, Sept. 21, 2007.

Jablonski, Gary John, '82, July 18, 2010.

ZETA OH Z

Marriott, James G., '49, September 11, 2000.

Sussman, Arthur Paul, '49, June 10, 2021.

Wittman Jr., Ralph Edwin, '65, no details.

ETA OH H

Regulinski, Thaddeus L., '50, April 6, 2021.

Hutcheson, Rufus Daniel, '60, Dec. 4, 2001.

Brockman, William Francis, '62, Nov. 6, 2007.

OKLAHOMA**ALPHA OK A**

Zirkle, George William, '58, March 4, 2017.

GAMMA OK Γ

Ortloff, William Frederick, '48, no details.

OREGON**ALPHA OR A**

Miehe, Frank, '50, no details.

Kato, Kazuo, '51, no details.

Haftorson Jr., Roy Gordon, '60, Aug. 11, 2004.

BETA OR B

Cannard, William James, '98, Jan. 30, 2011.

PENNSYLVANIA**ALPHA PA A**

Metius, Richard Edward, '42, Nov. 26, 2006.

Siegfried, Robert Edwin, '43, May 22, 2015.

Pieski, Edwin T., '45, January 16, 2007.

Roper Jr., Charles Ralston, '61, July 2, 2010.

BETA PA B

Goodman, Joseph L., '47, Nov. 22, 2018.

Levy, William W., '48, no details.

Ludwig, Donald Earl, '53, July 7, 2004.

Chiavacci, Silvio A., '56, January 25, 2010.

Stark, Malcolm Truman, '56, May 20, 2012.

Fahringer, William Harry, '61, Feb. 11, 2011.

Banaszak, Jerome James, '63, June 21, 2003.

Evon, Joseph Michael, '64, July 1, 2006.

GAMMA PA Γ

Sheehan, John Michael, '55, Jan. 23, 2002.

Jones, Russel Cameron, '57, May 8, 2021.

Mangold, Robert Bruce, '60, Feb. 23, 2004.

Thalimer, John Richard, '63, August 16, 2016.

Stanko, Ronald Thomas, '69, Nov. 4, 2015.

Oesterich, Lawrence C., '73, April 5, 2021.

DELTA PA Δ

Aron Jr., Fred William, '52, May 17, 2021.

EPSILON PA E

Carlson, Russell Leonard, '50, May 18, 2015.

Roth Jr., David William, '51, Feb. 27, 2017.

Litsinger, Robert William, '52, Sept. 26, 2018.

Evoy III, Martin, '53, December 17, 2007.

Baker, Russell Ernest, '60, no details.

ZETA PA Z

Armstrong, Robert Thomas, '42, no details.

Simons Jr., John, '42, November 9, 2020. **Cent.**

Wagner, Robert Earl, '44, June 15, 2013.

Bennethom, Earl W., '47, January 5, 2011.

Cecil Jr., John, '53, December 14, 2014.

Katz, Joseph Rubin, '55, April 30, 2020.

Hersh, David J., '68, July 21, 2009.

ETA PA H

Hole, James Emerson, '52, July 23, 2017.

Moore Jr., Malcolm C., '63, Dec. 8, 2005.

Winslow, Michael Lee, '93, March 31, 2004.

THETA PA Θ

Polek, Francis Anthony, '73, Oct. 29, 2000.

Reiber, Eugene F., '76, October 7, 2004.

Hakun, Andrew Gerard, '90, Feb. 20, 2021.

IOTA PA I

Werner, Robert O., '53, no details.

CHAPTER ETERNAL

Continued



Washington Beta '78

James D. Weddell

April 8, 2021

Architect lead on Pullman, WA, Main Street downtown revitalization project, restored other historic landmarks, and built functional housing for those with disabilities.

KAPPA PA K

Nolin, Gerald Emile, '46, August 18, 2020.

LAMBDA PA Λ

Pollock, Roy Arthur, '49, November 18, 2001.
Perhosky, Janet L., '86, no details.

PUERTO RICO

ALPHA PR A

Sanchez-Nieva, Ferdinand, '43, March 16, 2009.

RHODE ISLAND

ALPHA RI A

Sobolewski, Adam E., '49, no details.
Deforest, James Vincent, '50, Jan. 29, 2007.
Foster, Arthur Dwight, '50, Dec. 18, 2018.
Jacobs, Albert Jordan, '50, May 27, 2018.
Merriam III, Charles W., '53, Aug. 16, 2020.
Baldwin, Andrew William, '85, Nov. 5, 2004.

BETA RI B

Test, Frederick Laurent, '45, Jan. 6, 2018.
Riccio, Anthony Ralph, '67, no details.

SOUTH CAROLINA

ALPHA SC A

Beaudrot Jr., Joseph L., '41, June 12, 1996.
Cameron, Albert Neill, '41, Nov. 28, 2011.
Harshman, Richard C., '48, no details.
Denson, William Carl, '52, January 4, 2012.
Morrah, James Edward, '53, Jan. 15, 2021.
Goble, Ross L., '59, June 8, 2013.

BETA SC B

Williams, Thomas E., '50, Sept. 12, 2009.
Cislo, Stanley Raymond, '52, no details.
Engelmaier, Werner, '65, April 15, 2011.
Takach, Mark Wayne, '70, August 11, 2007.

GAMMA SC Γ

McCrary Jr., John N., '43, July 19, 2007.
Wertheim, Robert Halley, '45, April 29, 2020.

SOUTH DAKOTA

BETA SD B

Wild, Jack William, '48, September 27, 2020.

TENNESSEE

ALPHA TN A

Jones, Onie Merl, '41, no details.
Wright, Thomas Elmo, '43, February 5, 2005.
Landrum, Thomas H., '46, August 31, 2012.
Hixson, Sherman, '47, March 9, 2009.
Merritt, Stanley Yates, '48, May 8, 2019.
Hogue, Harold Thomison, '50, Dec. 28, 2020.
Womble Jr., Marion E., '50, Feb. 29, 2004.
Montague Jr., Charles A., '51, June 26, 2020.
Coppedge, John F., '52, March 21, 2021.
Marcum, Dexter, '53, no details.
Smith, Lloyd George, '59, no details.
Lin, Adrian Hsuan-seus, '66, Nov. 3, 2002.

BETA TN B

Strom, Floyd Clarence, '49, April 25, 2020.
Johnson, Richard Maurice, '69, no details.

GAMMA TN Γ

Calhoun, Jack Rowland, '49, Oct. 20, 2016.

EPSILON TN E

Merrill Jr., Bergen S., '43, Sept. 24, 2018.
Smith, Don Preston, '57, July 8, 2020.

TEXAS

ALPHA TX A

Furgason, Carl Moss, '41, no details.
Pilgram Jr., Walter, '43, May 13, 2014.
Yett, Fowler Redford, '43, April 11, 2003.
Kreisle, Leonard F., '44, June 14, 2004.
Meredith, Carlton, '44, November 18, 2020.
Sameshima, Ko Stanley, '44, Nov. 23, 2012.
Walling, Matthew Taylor, '44, no details.
Bixler, Glenn Jennings, '45, no details.
Krausse, Dan Marston, '45, June 8, 2019.
Marshall, Robert Leonard, '45, Nov. 12, 2020.
Mueller, Merle Charles, '45, January 3, 2019.
Vague, Glen Edward, '48, June 7, 2003.
Wahrmund, Robert Clinton, '48, no details.
Hussey Jr., Roland F., '49, March 6, 2000.
Kirby Jr., John Elmer, '49, January 7, 2014.
Carter, Lee Steven, '50, October 6, 2005.
King, Patton S., '50, May 4, 2005.
Braden, Robert Skeen, '53, October 18, 2001.
Sparks, Cecil Ray, '53, November 23, 2009.
Melton, Walter Curry, '56, June 23, 2021.
Best Jr., Clem K., '57, no details.
Richter Jr., Albert Paul, '59, April 20, 2003.
Karydas, Andreas Ioannou, '61, Nov. 22, 2013.
Prewett, David John, '77, February 12, 2013.

BETA TX B

Luckett Jr., Joseph Wheeler, '48, June 6, 2017.
Anderson Jr., William C., '49, June 6, 2008.
Bassett, Albert Leon, '49, February 19, 2012.
Emmett, Glenn Ernest, '49, Nov. 9, 2020.
Minshew Jr., Clyde, '49, April 24, 2010.
Perkins, Thomas Dwight, '49, May 24, 2017.
Fitzgerald, Hiram Campbell, '53, Oct. 6, 2006.
Dietering, Earl Acie, '56, August 9, 2018.
Biggerstaff, Charles R., '57, June 5, 2021.

GAMMA TX Γ

Reeves, John Lloyd, '54, February 2, 2004.
Ashcraft, Douglas Gale, '74, May 29, 2013.

DELTA TX Δ

Monteith Jr., Edward E., '43, Aug. 17, 2008.
Stiles, Loren Harvin, '48, Nov. 23, 2012.
Blair III, John Edward, '49, March 31, 2010.
Creider, Erwin John, '49, July 21, 2016.
Gathings, James Edward, '49, Jan. 17, 2019.
Neely Jr., Roy Griffith, '49, Dec. 24, 2017.
Talbert, Norwood Keith, '49, July 5, 2002.
Terrill, Wayne Hamaker, '49, no details.
Barnes, Samuel H., '50, August 5, 2018.
Van Tuyl Jr., Andrew Jolly, '51, Sept. 20, 2004.
Burluson, Kenneth Stewart, '55, no details.
Duke, Paul Malcolm, '57, no details.
Dupuy, Laurence Hamil, '60, July 22, 2007.
Pfeiffer, Joseph Christian, '62, Jan. 4, 2006.
Carnes, Benny Lee, '69, March 31, 2021.
Raney, Thomas Joseph, '73, no details.

EPSILON TX E

Colburn Jr., Johnnie W., '66, Dec. 23, 2007.
Johnston, Stephen Wayne, '70, Oct. 13, 2017.
Saums, Ronald Wayne, '75, April 21, 2009.

ZETA TX Z

Rolen, Thomas Joel, '70, November 21, 2017.

ETA TX H

Jenkins III, Charles W., '74, no details.

IOTA TX I

Schedler Jr., Edmund Willis, '49, Feb. 8, 1992.

UTAH

ALPHA UT A

Holbrook, Stanford Taylor, '49, Sept. 24, 2005.
Smith, Henry Frank, '50, November 26, 2001.
Hodson, Richard Elmo, '66, no details.

BETA UT B

Lawrence, Steven Dean, '71, no details.

GAMMA UT Γ

Ackerman, Paul Allen, '84, Feb. 26, 2006.

VIRGINIA

ALPHA VA A

Weber, Andrew, '39, August 24, 2015.
Janssen, Benno, '43, March 14, 2012.
King Jr., Smithey Cannon, '51, April 27, 2012.
Goeller, Leo Frederick, '53, August 3, 2011.

BETA VA B

Belton Jr., Joseph Franklin, '41, July 12, 2014.
Prucha, Richard Vance, '44, January 9, 2014.
Rifkin, Arthur Robert, '47, October 7, 2014.
Davis, Robert Vernon, '49, Nov. 2, 2002.
Weinstein, Marcus Leroy, '49, Aug. 23, 2000.
Farmer, Willard Guy, '50, March 19, 2002.
Franklin Jr., James Stuart, '50, Dec. 11, 1999.
Rankin Jr., William G., '50, March 28, 2004.
Walsh, Thomas Clyde, '50, April 4, 2015.
Oliver, Rayburn Justice, '51, August 13, 2016.
Farley, William Marshall, '52, June 28, 2003.
Harrison, Howard Octavious, '52, Feb. 5, 2020.
Croy, Alvin Quentin, '54, June 21, 2020.
Bostian, John Alexander, '55, March 21, 2017.
Bucklen, Okley Bert, '59, March 5, 2021.
Steele, James Randolph, '63, Aug. 17, 2018.

DELTA VA Δ

Smith, Jeffrey G., '43, March 21, 2021.
Naschold Jr., Eric T., '50, October 17, 2017.
Lanford, John C., '52, February 21, 2020.

WASHINGTON

ALPHA WA A

Noritake, Cyrus Shaichi, '41, no details.
Sparks, Rance Louis, '50, no details.
Walton, David Albert, '53, August 1, 2004.
Ott, Charles Robert, '55, no details.
Gill, Robert Wendell, '57, December 9, 2005.
Ryder, Donald Robert, '57, Dec. 18, 2008.
Dixon, Robert Jerome, '58, Feb. 25, 2010.
Gidlund, Erick Ray, '59, no details.
Johnson, Irving Manfred, '59, Feb. 20, 2002.
Carter, Jerry Maxwell, '60, Dec. 18, 2007.
Decker, Donald Henry, '61, no details.
Hodgkins, Chester Elmond, '62, no details.
Dahlbeck, William A., '73, no details.

BETA WA B

Pearce, Warren Nelson, '47, March 7, 2017.
Gerlitz, Richard Kenneth, '50, March 14, 2000.
Weddell, James Douglas, '78, April 8, 2021.

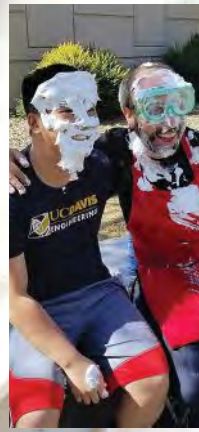
GAMMA WA Γ

Thunem, Scott Paul, '92, no details.



Tau Beta Pi
The Engineering Honor Society

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FOR THE
9th ANNUAL**



www.tbp.org/other/PiDay.cfm

TAU BETA PI DAY

3.14.22



March 14, 2022—wear your Bent or TBPI apparel, participate in an activity (virtual or in-person), and post on social media with **#taubetapiday**

CHAPTER ETERNAL

Continued from page 36

WEST VIRGINIA

ALPHA WV A

Nunnally, Thomas Marland, '41, April 4, 2010.
Poindexter, James M., '41, March 25, 2002.
Kincaid, Eugene, '42, no details.
Bartlow, Willis Davidson, '44, April 23, 2010.
Robinson, Clarence Luennis, '47, no details.
Backus Jr., Frank Harry, '58, March 17, 2020.
Costanza, Russell Vincent, '62, May 28, 2020.

WISCONSIN

ALPHA WI A

Iura, Toru, '45, September 7, 2020.
Cleasby, John L., '50, March 24, 2021.
Bodenstein, Neil Frank, '51, January 7, 2021.
Conant, Orin True, '51, December 16, 2008.
Gantenbein, David Carver, '60, no details.
Streiff, Stuart D., '78, April 12, 2007.
Rutigliano, Charles R., '85, no details.

BETA WI B

Tassell, Tedd Field, '44, October 19, 2012.

Southwick, Max Berry, '45, May 20, 2013.
Throckmorton, Kenneth L., '45, Dec. 6, 2018.
Holtermann, Theodore J., '54, Nov. 15, 2020.
Ware, Walter J., '71, September 9, 2007.

GAMMA WI Γ

Griffin, Michael M., '93, February 5, 2021.

WYOMING

ALPHA WY A

Bishop, Floyd Albert, '42, May 29, 2018.
Gose, Robert Oren, '47, September 15, 2020.
Baldwin Jr., Leonard B., '48, April 21, 2021.

GEORGIA GAMMA INSTALLED



Images provided by David Calamas, Ph.D., associate professor & undergraduate program coordinator at Georgia Southern University.

GEORGIA GAMMA

was installed as a Tau Beta Pi Chapter at Georgia Southern University on October 9, 2021. Councillor Michael L. Peterson, *LA A '89*, was the official installing deputy of the Society's 257th (251st active) collegiate chapter, assisted by Executive Director Curtis D. Gomulinski, *MI E '01*, and District 5 Director Josuan Hilerio Sanchez, *PR A '07*.

The 2020 Unvention granted a chapter to Tau Beta Gamma, represented virtually by Nicholas Jenkins (president), Austin Sumner (treasurer), Jonathan Link (vice president), and David Calamas, Ph.D. (chief advisor). The chapter's installation was delayed several months to ensure the ceremony could be conducted given the ongoing COVID-19 pandemic.

The new Engineering & Research Building was the site of the formal ceremonies of initiation and chapter installation, witnessed by local TBPI alumnus John M. Adan, *NH A '71*. Following the ceremony, Mr. Adan congratulated the new members of Georgia Gamma, shared a little about his career in engineering, and expressed his enthusiasm to have a chapter of Tau Beta Pi in Statesboro.

The day's activities also included an orientation session for the new chapter's officers led by Mr. Gomulinski and Mr. Hilerio Sanchez.

INITIATION TEAM

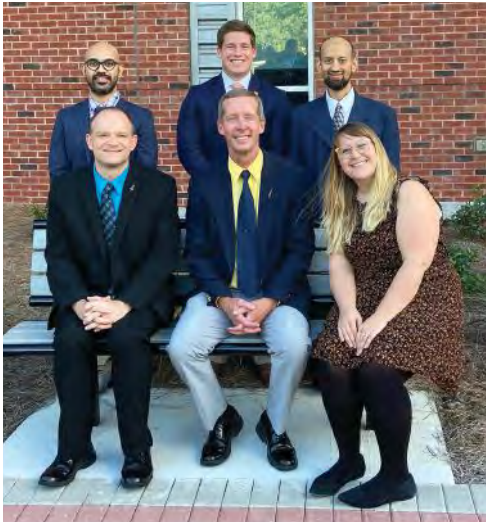
The initiation team included: Samuel B. Dodd, *SC A '22*; Kimberly A. Romsstad, *MI O '14*; and Salman A. Siddiqui, Ph.D., *FL H '00*; and the three Association Officials listed previously. There are sixteen charter members and one eminent engineer (identified on the facing page). The group of charter members was small due to the COVID-19 pandemic, but an additional initiation ceremony is planned where alumni of the local Tau Beta Gamma Engineering Honor Society (predecessor to Georgia Gamma) will be invited back to campus to become members of Tau Beta Pi.

Following the formal initiation, the new members were constituted a new chapter in the ceremony of installation conducted by Councillor Peterson. The ceremony included the formal election and installation of the chapter's charter officers and advisors.

After the installation ceremony, attendees proceeded to the Information Technology Building where a dinner was held for the new members, their guests, and representatives of Tau Beta Pi. Brian L. Vicek, Ph.D., chair of the mechanical engineering department, spoke to the new chapter members on behalf of the college's administration. He congratulated the new members on the establishment of their chapter and gave special recognition to Dr. Calamas for his diligent work over the past seven years to bring a Tau Beta Pi chapter to Georgia Southern.



Charter Presentation (left to right)
David M. Calamas, Frank A. Martin,
Michael L. Peterson, and Curtis D. Gomulinski.



Initiation Team (left to right)
 Front Row: Curtis D. Gomulinski,
 Michael L. Peterson, and Kimmy A. Romstad.
 Back Row: Josuan Hilerio Sanchez,
 Samuel B. Dodd, and Salman A. Siddiqui.



Chapter Advisors (left to right)
 Eminent Engineer Initiate David M. Calamas with
 fellow GA Gamma Advisor Salman A. Siddiqui.



Student Initiates (left to right)
 Front Row: Lindsey Jobba-Dowling, Ashlyn B. Jackson, Brendan J.D. Carroll, and Manuel R. Abadie.
 Back Row: Michael W. Jones, Noah E.C. Dyer, Frank A. Martin, and Matthew E. Hyle.



Student Initiates (left to right)
 Front Row: Kayla R. Tidwell, Aidan P. Rowell,
 Lily H.C. Parker, and Amelia L. McNamee.
 Back Row: Khody R. Sellers, Rhashaan M. Omar,
 Robert R. Moore, and Uriel M. Morales Ortiz.



First Officers (left to right)
 Front Row: Michael W. Jones, Manuel R. Abadie,
 Ashlyn B. Jackson, and Rhashaan M. Omar.
 Back Row: David M. Calamas, Frank A. Martin, Salman A. Siddiqui.

M. Lucius Walker Jr., DC A '57

M. Lucius Walker Jr., was born on December 16, 1936, in Washington, D.C. At the age of fifteen, after attending Armstrong High School for one year, he received a Ford Foundation scholarship to attend Morehouse College in Atlanta, GA. He transferred to Howard University to study engineering, graduating with his bachelor of science degree in mechanical engineering in 1957, the first HU engineering student to graduate summa cum laude. He continued his studies at Carnegie Institute of Technology (now Carnegie Mellon University) in Pittsburgh, PA, earning his master of science degree in mechanical engineering in 1958 and his Ph.D. in 1966. While studying for his doctorate, he was employed as an instructor by both the Carnegie Institute and Howard.

He joined the HU faculty in 1963 as an assistant professor in the Department of Mechanical Engineering and upon receiving his Ph.D., was promoted to associate professor. He became a full professor in 1970 and in 1976, a graduate professor of mechanical engineering and the acting dean of the school of engineering. He was appointed dean in 1978 and served in that capacity until his retirement in 2002, when he became an HU professor emeritus.

Dr. Walker was a charter member of the DC Alpha Chapter. He was instrumental in the establishment of two national scholastic organizations that worked to increase the number of minority students in engineering. In 1972, he co-founded and directed the Engineering Coalition of Schools for Excellence in Education and Leadership, a National Science Foundation-sponsored coalition of engineering schools at seven major universities. He co-founded the Advancing Minorities Interest in Engineering Organization in 1991 to expand corporate, government, and academic alliances to attract, educate, graduate, and place underrepresented minority students in engineering careers.



M. Lucius Walker in 1955.

During his time as dean, he supported TBPI and other HU honor and professional societies, vigorously promoting the inclusion of humanities and science courses in the engineering curricula and championed a technical and liberal education through extracurricular activities. He was a proponent of writing and during his tenure as dean, *The Howard Engineer Magazine* garnered many national awards. He also promoted the community involvement of engineering students such as volunteering at soup kitchens and at local K-12 schools to help educate young students about the role of science and engineering in their daily lives.

His concern for the human condition, and the need for compassionate engineers, extended beyond the university campus to national and international locations. He was instrumental in supporting the HU collaborative, interdisciplinary project with the Republic of South Africa, which sent student teams to help improve local universities and advance living conditions. He served on the board of directors at Carnegie Mellon University, the Alexandria-based nonprofit group Junior Engineering Technical Society, and the Center for Naval Analyses, a military-affiliated think tank in Alexandria, VA.

A recipient of numerous notable awards, Dr. Walker received the Black Engineer of the Year Award from *U.S. Black Engineer and Information Technology* magazine in 1988 and in 2008, received the Howard University Distinguished Alumni Achievement Award. In 2013,



M. Lucius Walker in 2012.

he was selected to receive the TBPI Distinguished Alumnus Award in recognition of his innovative leadership, dedication to improving engineering curricula, and pioneering work in humanitarian efforts. Unfortunately, he died a few months prior to the award presentation and was honored posthumously on November 2, 2013, at the 108th TBPI Convention held in Ames, IA. M. Lucius Walker Jr. died on June 6, 2013.

Robert E. Efimba, MA B '63

Robert E. Efimba, Sc.D., P.E., with roots in the village of Dienyi in the Oroko tribe, was born on November 1, 1939, in the town of Mamfe in Southern Cameroons (now South-West Cameroon), where his father was stationed as a public elementary school teacher. The value and need for education was imprinted on him very early in life by his parents and grandparents who served as role models. His maternal grandfather instilled in him a moral compass that he continues to use to treat all persons with respect and compassion, regardless of their race, gender, religion, rank, or economic/social status.



1867



Robert E. Efimba in 2019.



Robert E. Efimba in 1965.

Dr. Efimba stated that as early as age 10, he saw the need for improved housing, clean drinking water, and better roads, and was motivated to become a civil engineer when he grew up. As a result of his high academic performance in high school, he was selected by the Cameroons Development Corporation to receive a full scholarship to the Massachusetts Institute of Technology (MIT). He credits the scholarship award to the intervention of the late MIT Professor Carroll L. Wilson whom he considers his benefactor.

He received four degrees in civil engineering from MIT: B.S. (1963), M.S. (1965), professional degree (1969), and Sc.D (1972). Dr. Efimba is enshrined in the MIT Museum with a photo (above) showing him designing the support system of the 13-ton Blue Whale Exhibit in the New York City Museum of Ocean Life. He is a registered professional engineer and has had a long and distinguished career as a practicing civil engineer and is now chairman of the board of the STODAD Corporation, Engineering Consultants. He has received numerous honors for his service to the engineering profession. As past president of the District of Columbia Council of Engineering and Architectural Societies, he was honored in 2013 with their Council's Lifetime Achievement Award. Dr. Efimba is also a life member of ASCE and past co-recipient of their Moissieff Award for best paper in the field of structural design, related to the 82-story SOI building in Chicago, IL.

In addition to his distinguished career as a civil engineer, Dr. Efimba has also been recognized as an outstanding educator and student mentor. After receiving his master's degree, he served as a lecturer in civil engineering at the University of Nigeria, Nsukka, and worked as an engineer with the public works department in Victoria (now Limbe), Cameroon, where he designed the Limbe Bridge that was opened to traffic in 1967. In 1975, he joined the Howard University civil engineering faculty as an assistant professor and, as an associate professor of civil engineering since 1982, has been teaching courses in engineering mechanics, matrix structural analysis, and design. Dr. Efimba is known for challenging and motivating students to look around them to see the important role and impact that civil engineers have on the lives of people, and to strive to be the best engineers they can be by working to attain professional licensure to practice, teach, or perform research. He inspires his students when they graduate to create great civil engineering works, but also find ways to serve the many peoples of the world who live in poverty and are in need of even the most basic infrastructure components. He has been honored numerous times for his research and teaching, including receiving a 2012 Centennial Career Achievement Award from the College of Engineering, Architecture, and Computer Sciences at Howard.

Dr. Efimba became a DC Alpha Chapter Advisor in May 1977 and has served as Chief Advisor since 1987. He credits the successes of the chapter to great teamwork, collaboration, and dedication by fellow advisors and chapter officers, with outstanding support from the dean, provost, TBIT's District 4 Directors, and Headquarters staff. The DC Alpha Chapter was the first at an HBCU, having been established at Howard University as the 100th TBIT chapter. During his 34 years of leadership as Chief Advisor, DC A has risen to become one of the preeminent Association chapters. He has been cited by DC A chapter officers and members for his personality and commitment to inspiring excellence.

Under his leadership, the image and visibility of TBIT at Howard has greatly increased, including the university administration's recognition and appreciation of the chapter as a vital part of college life. Joining Tau Beta Pi is widely sought by HU engineering students, with initiation and membership acceptance rates of eligible students near 100 percent. In 1977, DC A had fewer than 550 total members. In October 2020, this number had increased to 1,493 total members; therefore, two-thirds of all DC A members have been initiated since he became a chapter advisor and more than half of all members have joined while he has been Chief Advisor. From the TBIT Association, DC A and its members have received numerous awards including: 19 Fellowships, 26 Scholarships, 7 Distinguished Alumnus Award recipients, 2 Laureate recipients, 3 Greater Interest in Government project grants, and in 2016 the chapter received the Association's highest award as the nation's best chapter, the R.C. Matthews Outstanding Chapter Award.

In 2010, Dr. Efimba was recognized as the TBIT Outstanding Advisor, the Association's top advisor award. In nominating him for the award, his chapter stated: "While there are definitely a number of outstanding advisors throughout Tau Beta Pi, none of them is perhaps as essential and appreciated as Dr. Efimba is at DC Alpha." He continues to be an important contributor both to the success of the chapter and the work of the Association.

Executive Council MEETING MINUTES

These are the summaries from Executive Council (EC) Meetings — February 2021 through April 2021.

February 22, 2021

Virtual

The EC approved the appointment of **Daniel T. Kruusmagi, CA H '13**, to the Convention Program Planning Committee.

Executive Director Gomulinski delivered his written report to the Council (EC). Councillor Peterson inquired about the status of the fiscal year budget and Mr. Gomulinski stated it was tied to the Fund Transfer Project and also noted that the audit should be completed within a month after the project is finished.

President Smith presented the President's report, discussed the Social Awareness Listening Session, with plans to move forward and the need for a professional to moderate the session; and develop a performance review with rating scale using the same categories from the Board Source review used last year.

The Strategic Planning Task Force charter was reviewed by the EC and Councillor Pierce moved to approve as modified and the EC approved on a voice vote. The DEI Task Force proposed charter was reviewed by the EC and Councillor M. Youssef moved to approve the charter, with minor grammatical fixes, and the EC approved on a voice vote.

The EC reviewed the preliminary petition from the American University of Sharjah; Councillor Pierce moved to approve the petition and schedule an inspection when appropriate and after discussion, the EC approved. The EC meeting schedule for 2021 was presented and Councillor Pierce moved to approve the proposed schedule with the understanding that it could change; the EC approved. District Conference assignments were discussed, various updates were made, and the EC approved on a voice vote.

March 15, 2021

Virtual

The EC awarded a Resolution of Appreciation to **Kaleia Kramer, AZ B '16**, for two years as a District 1 Director. The EC appointed **Jacqueline A. Reyes, TX Ø '17**, as a District 13 Director to a term starting 3/15/21 and ending 6/30/23.

Executive Director Gomulinski delivered a verbal update to the EC. The AMS project continues with interviews concluding later this week; the Fund Transfer Project should be completed by the end of March; the TAC

continues their review for a new trustee with a recommendation to the EC upcoming; and a tracking spreadsheet of the EC's action items was developed.

Councillor M. Youssef reported on the recent Awards Committee meeting and discussed proposals for potential new awards that will be brought to the EC in the coming months. Secretary Alexander presented the report of the Image and Marketing Committee and three major action areas will be the focus of the committee: website completion, marketing materials updates, and store merchandise improvements. The Strategic Planning Task Force update was presented by Councillor Sciacca, who will be meeting with various stakeholders to establish SMART goals on an annual basis. Stakeholders will include staff, committees, and program directors. A central dashboard will be developed for monthly reporting. The Strategic Plan proposal should be ready for EC approval on April 19 with milestones prepared; a current draft of the plan proposal was presented.

Councillor Pierce moved to accept the preliminary petition from the University of Georgia and to authorize an inspection when travel restrictions are lifted and the EC approved on a voice vote. Councillor Sciacca discussed progress of the performance review procedure; it will be a standard review used for the Executive Director and staff. A Google survey will be distributed to the EC for anonymous completion and the Executive Director will review and produce three goals to improve. The new timeline would have reviews completed in the spring with time for performance and compensation discussions to occur before the end of the fiscal year.

April 19, 2021

Virtual

Councillor Sciacca presented the current draft of the Strategic Plan and moved to approve it. Secretary Alexander inquired about the Governance Committee's role in overseeing the Strategic Plan and Councillor Pierce responded that the EC is ultimately responsible for the Strategic Plan and the Governance Committee will ensure steps are carried out; after discussion the EC approved the Strategic Plan as presented.

Director of Development Sherry Jennings-King presented the proposed structure and naming of new AGP donor clubs and noted the historical significance of the new titles and their relation to TBII's history.

President Morales asked if the names could be changed in the future, if necessary and Ms. Jennings-King stated they could be changed if circumstances required and she moved to approve the new AGP clubs, including their naming and colors, and the EC approved on a voice vote. Ms. Jennings-King presented the structure and goals of the proposed Trestle Society; Councillor Pierce moved to approve the Trestle Society proposal and the EC approved on a voice vote. Ms. Jennings-King presented the EC Challenge Match and its proposed timeline and structure and noted that this would not be required participation and endowments would not be allowed; she moved to approve the EC Challenge Match and outreach efforts to past and present members of the EC, and it was approved on a voice vote.

April 30, 2021

Virtual

Executive Director Gomulinski discussed the status of a few struggling chapters and their initiation plans, the current status of the AMS request for proposals, and progress of the Fund Transfer Project & briefly discussed the potential of online initiations continuing after their expected expiration.

Councillor M. Youssef provided recent updates from the Convention Planning Committee to the 2021 Convention schedule, the financial impact of not holding an in-person Career Fair, and noted the Virtual Career Fair is a one-year change to the schedule. Secretary Alexander asked about recruitment of additional companies to attend the Virtual Career Fair and Dr. Youssef and Director of Alumni Affairs, Tricia Gomulinski, have plans to reach out through different channels that have been used in the past and President Morales inquired about the timeline of the release for pricing and scheduling.

The Trust Advisory Committee prepared a presentation on the OCIO Process. TAC member Jim Johnson presented the Trust Advisory Committee's report to the EC. Vanguard representatives delivered a presentation to the EC. Councillor Peterson asked about the comparison of recent TBII returns vs average Vanguard returns. Mr. Johnson noted it should not be expected that returns will decline and the size of the portfolio necessitates additional professional assistance.

Mr. Johnson also inquired about the timeline of the transition and Mr. Gomulinski noted it would be advantageous to have all changes completed by the end of the year. Councillor Pierce moved to accept the TAC's recommendation to select Vanguard as the new TBI Trustee and after discussion, the EC approved the selection.

Treasurer Fable presented the Charter for the Chapter Development Committee, developed through collaboration with the original authors of the proposal. Councillor M. Youssef asked about the appointments with shorter volunteer terms and Councillor Fable noted it was intended for term alignment. Councillor Peterson asked if this would be considered a trial program for three years and Mr. Fable

stated it would be beneficial to review any feedback after a trial period concludes.

The following members were appointed to the Chapter Development Committee:

Allen D. Erickson, NM Γ '14, to a term starting 5/1/21 and ending 6/30/22

Ann M. Brunton, AZ A '20, to a term starting 5/1/21 and ending 6/30/22

Ian J. Frank, NY II '09, to a term starting 5/1/21 and ending 6/30/23

Phiwat Klomkaew, AL E '18, to a term starting 5/1/21 and ending 6/30/21

Kavya U. Thakar, CA E '20, to a term starting 5/1/21 and ending 6/30/23

Scott M. Trocchia, DC Γ '11, to a term starting 5/1/21 and ending 6/30/21.

Ms. Youssef moved to approve the charter for the Chapter Development Committee and the appointments as listed; after discussion, those EC present approved the charter pending ratification by a quorum of the EC at the next meeting.

Ms. Youssef delivered a presentation on the upcoming installation and inspections that need to be completed this year.

YOUR LETTERS

Continued from page 3.

Continued from Page 3

The energy to drive a vehicle at a speed for a distance is a function of its shape, size, and mass. It is independent of the propulsion system. There are many ICEVs that are similar in shape and size to EVs that get good mileage. For a similar range, the EVs, in general, have more mass.

When a portable power is required, the ratios of power to mass and power to volume are important. When the system is for space flight, it is extremely important and the major factor. This is the advantage of the ICE propulsion system.

An EV does nothing that an ICEV doesn't do. It is a vehicle. For EVs to be economically accepted, they must have a measurable advantage over ICEVs. Currently, EVs offer a small improvement in the environment, shorter range, more time at the "pump," and increased cost.

I feel that a technology is being forced on us. For a new technology to become accepted, it must offer to do something we couldn't do before or to do something easier at a reasonable cost. In 70 years, the electronic computer went from a huge stationary device to something one can wear on their wrist and a household appliance.

The economy will never switch from an existing energy system to a more expensive energy system. It can't succeed.

William Beans, Ph.D., OH Γ '93

Powering Our EV Future

I read with great interest the article by Alan Brown. First, let's get one thing straight, I am not against being good stewards of our planet. I installed CFLs when they were being pushed and I have LED lights throughout my home now. I also have a high efficiency heating/AC unit and an energy star refrigerator.

The article was well written and explained the pros and cons of EVs. May I suggest a couple of additional considerations.

1. EV batteries do not have an infinite lifetime. They are also expensive to replace. What is the solution to their disposal?
2. Anyone who has had elementary science classes knows that the sun warms up the Earth during the day and then the warmed Earth radiates the absorbed heat back into the atmosphere at night. If we cover the ground with large arrays of sunlight-collecting devices, the ground beneath them will not get heated. Therefore, there will not be any heat to radiate back into the atmosphere. The question I have is this, "Won't this ultimately have an adverse effect on the climate?"

3. This principle can be advanced with regard to windmill farms. Not all the air blows through the windmills. The wind will take the easiest path, ultimately changing the surrounding weather patterns.

Alan's points on who will pay for these new power plans was well stated. We, the taxpayers, are already paying for the alternative power generating stations through our taxes. If alternative energy is going to compete, it ought to do so on its own. The question is whether the people who are purchasing these forms of energy know the REAL cost. They are being deceived into thinking they are doing their part of being good stewards of the Earth. Last but not least, just suppose that CO2 is not the culprit of 'global warming.' Suppose the models are wrong. After all, the weathermen I listen to on the news have a very difficult time predicting a week's worth of weather now. Do you really believe they can correctly predict the weather a few years from now?

Rod H. Ashford, TX H '76

ASSOCIATION BRIEFS



Neal McCaleb with **Caleb M. Bengs**, *OK G '21*, the TBII McCaleb No. 1 Scholarship recipient.



Norb J. Delatte Jr., Ph.D., P.E., *SC G '84*, endowed professor of engineering and head of the school of civil and environmental engineering at OSU with Neal McCaleb.

ALUMNI ACTIVITY: PIONEER ALUMNI CHAPTER (OK) AWARD RECEPTION

On September 23, **Neal A. McCaleb, P.E.**, *OK I '57*, was recognized with an awards reception at the Oklahoma State University (OSU) College of Engineering, Architecture, and Technology ENDEAVOR LAB in Stillwater, hosted by the Pioneer Alumni Chapter.

Members of the alumni chapter, the OK Gamma Chapter, the Center of Sovereign Nations, and OSU staff attended.

McCaleb was named a 2021 TBII Distinguished Alumnus for his service as an engineer and leader to his tribe, state, and country in business and politics.

"My father was Tau Beta Pi at Arkansas University, class of 1921, and was influential on my career choice," said McCaleb. "I was inducted into TBII in 1976, 19 years after my graduation. It is very meaningful for me to receive this recognition."

Thanks to **Kurt P. Rouser**, Ph.D., *OH H '11*, for submitting these images. Contact the chapter at: tbp.pioneer.alumni@gmail.com.

JOIN AN ALUMNI CHAPTER AND EVEN BECOME AN OFFICER!



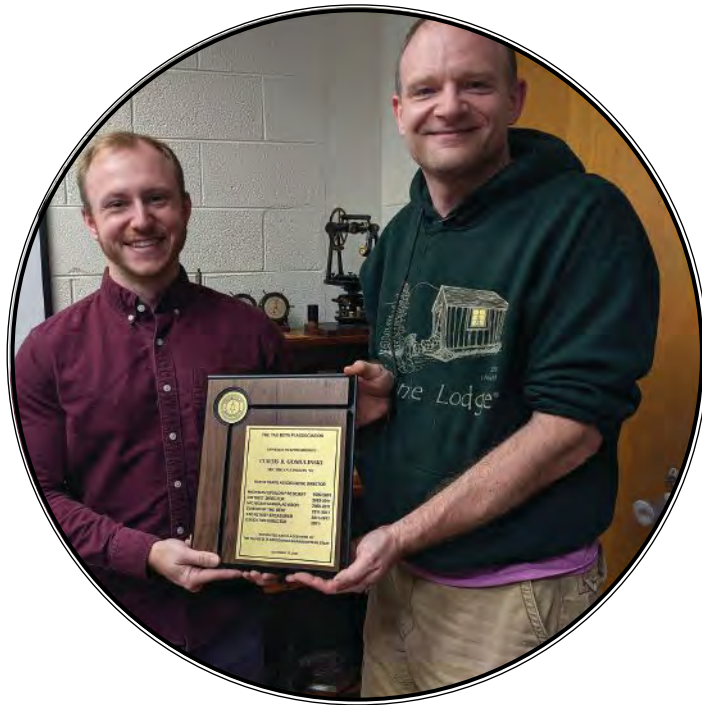
Tricia E. Gomulinski, *SD A '98*, is Director of Alumni Affairs and works as a software/IT project manager for Teledyne Brown Engineering in Knoxville. Visit: www.tbp.org/?ACcontact or, contact tricia@tbp.org, to discuss the possibility of establishing a chapter near you.



NEW MEMBER OF EDITORIAL BOARD APPOINTED:

In September, **Bridget A. Moorman**, *AZ B '85*, COL, USAF (Ret.), was approved by the Executive Council to join *The Bent's* Editorial Board, as its fifth member. She currently lives in Germany working as a clinical systems integration manager for the U.S. Department of the Army's Regional Health Command-Europe. She is also an adjunct professor at the University of Connecticut, owns an international consulting business, and has been published in several journals. Bridget joined TBII while earning her B.S. degree in mechanical engineering from Arizona State University and has two master's degrees in biomedical engineering and health informatics. Her hobbies include flying, snow skiing, badminton, hiking, reading, and crocheting. Bridget authored a feature in this issue, "How Does Engineering Bridge into the Traditionally 'Creative' Realm of Music?," on [page 6](#).

Information about the Editorial Board is available on our website: www.tbp.org/about/eBoard.cfm



On Sunday, October 17, 2021, members of TBPI Headquarters staff, the Great Smoky Mountains Alumni Chapter, TN Alpha Chapter, and Curt's family attended a surprise reception to celebrate the 10-year anniversary of Executive Director Curt Gomulinski.

(Left to Right): Alex Cross, Assistant Director of Member & Chapter Services, with Curt.



INTERESTED IN A BENT MONUMENT?

Many Tau Beta Pi Chapters across the U.S., and one in Qatar, proudly display Bent monuments on their campuses. This is a great way to bring attention to the Association and your chapter. Currently, our vendor offers a 4' unpolished Bent, an 18" unpolished Bent, and an 18" polished Bent. If your chapter is interested in ordering a monument or if you have questions, please contact angie@tbp.org.

This fall, Wyoming Alpha Chapter initiates polished the Bent monument on campus for the first time since COVID lock downs. Image courtesy of Renee M. Schoenborn, P.E., WYA '85.

HEADQUARTERS WELCOMES TWO NEW STAFF MEMBERS:



Kailey Grace Churchill joined the team at HQ in August as a Marketing and Communications Specialist. She is a senior at the University of Tennessee and will graduate this December with a degree in business analytics and a collateral in international business. Kailey will

help manage the Association's social media channels, analyze recorded metrics, assist with front-end website management, create videos, and write press releases.



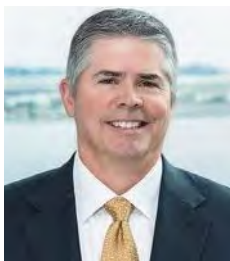
Wilhelmina Hill-Bearhs is one of HQ's new Marketing & Communications Specialists. She grew up in Maryville, TN, and has lived in the Knoxville area for most of her life. She attended the Memphis College of Art, where she graduated cum laude in design arts and minored in art history. She manages the Association's media channels, updates publicity materials, and is the associate editor of *The Bulletin*, our quarterly on-line publication for collegiate members.

association's media channels, updates publicity materials, and is the associate editor of *The Bulletin*, our quarterly on-line publication for collegiate members.

More information about the TBP HQ staff is available on our website: www.tbp.org/about/hqStaffBios.cfm

ALUMNI NOTES

Your fellow Tau Bates are interested in news about **you**.



CALIFORNIA GAMMA '86

Frank E. Scherkenbach

Frank was inducted as a Fellow of the American College of Trial Lawyers. He is a principal at Fish & Richardson in the firm's Boston, MA, office and his practice focuses on complex, high-technology litigation. He earned a B.S. degree in mechanical engineering from Stanford University.



MASSACHUSETTS BETA '20

Katie Bacher

Katie was named conference-level nominee for the 2021 NCAA Woman of the Year Award, nominated by MIT. She graduated with dual degrees in electrical engineering and computer science, earned Academic All-American status three times, and was the 2020 Div. III Academic All-American of the Year for cross country and track & field.



DELAWARE ALPHA '79

Vance V. Kershner

Vance is the 2021 Citizen of the Year Award recipient from the Del-Mar-Va Council and Boy Scouts of America, the highest community honor. He is president and CEO of Labware, Inc., previously worked for DuPont, and earned a B.S. degree in mechanical engineering from the University of Delaware.



MASSACHUSETTS EPSILON '71

David J. Miller

David is a recipient of the Joyna Bozzotto Award from Boston Partners in Education for his "long-standing commitment to Boston Public Schools students across the city." He retired in 2016 from a 35-year career in electrical and software engineering and has B.S. and M.S. degrees from Northwestern.



DISTRICT OF COLUMBIA BETA '22

Anna M. Maupin

Anna was nominated for the 2021 NCAA Woman of the Year Award by The Catholic University of America. She is "one of the best lacrosse players in the history of the program," has 93 career goals, a B.S. in architecture and civil eng'g, and named the 2021 conference Women's Lacrosse Senior Scholar Athlete.



MICHIGAN ETA '01

Jeffrey M. Roman P.E.

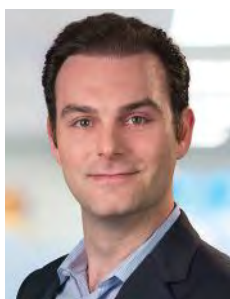
Jeffrey is the 2021 Engineer of the Year Award recipient from the Professional Engineers of North Carolina. He is a partner and engineering practice leader for Little Diversified Architectural Consulting, passionate about STEM outreach, and has a B.S. in civil eng'g from Lawrence Technological University.



ILLINOIS ZETA '89

Jude H. Restis

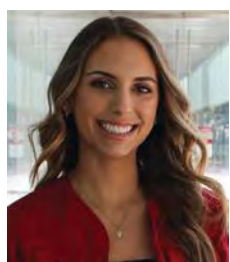
Jude started a new position as Chief Technology Officer for Partworks, a startup recently awarded a contract from the U.S. Air Force for development and testing of fatigue repair/prevention solutions for their jets. He retired from Boeing in 2020 after a distinguished 32-year career in structures testing.



NEW JERSEY DELTA '07

Mark J. Daniels

Mark has been promoted to partner of Brookwood Financial Partners, LLC, where he also serves as managing director and chief strategy officer. Previously, he worked for Stroud Consulting as a senior operations consultant and as founder and CEO of Digital Field Theory, a sports software company.



LOUISIANA DELTA '20

Abigail C. Flynn

Abigail has joined the U.S. Forensic team in Lafayette, LA, where she will assist the accident reconstruction team with equipment operation, data compilation, EDR imaging, and engineering calculations. She obtained her B.S. degree in mechanical engineering from the University of Louisiana at Lafayette.



NEW YORK THETA '51

Robert H. Donaldson

Robert, president of Delta Planning, Inc., has been honored with Clarkson University's Most Prestigious Alumni Award. He received his B.S. in chemical engineering and an M.S. degree in industrial studies from the University of Rochester. He founded his management consulting firm in 1982.

Send items about civic activities, honors won, weddings, promotions, etc. to Tau Beta Pi, P.O. Box 2697, Knoxville, TN 37901-2697 or to media@tbp.org. Material for publication must be received by February 1 for the Spring issue and May 1 for the Summer issue. Include name, address, chapter/class year, and email address or phone number. Thank you!



Abhiram (left) and David Wells (right). Image courtesy of Abhiram Karuppur. For more information about Tau Beta Pi's history, visit our website at: www.tbp.org/recruit/recruitHistory.cfm

NEW JERSEY DELTA '19

Abhiram Karuppur

Abhiram works as an investment associate at Ara Partners, a decarbonization fund. On a recent business trip to the Netherlands, he met David Wells. They got to chatting and Abhiram mentioned that he is a Tau Beta Pi member and volunteer. It turns out that David's great-great-grandfather was **Edward H. Williams Jr., Sc.D., PA A 1875**, the founder of Tau Beta Pi!

He had grown up hearing about Tau Beta Pi from his parents and grandparents, and still has some of Edward Williams' antique possessions.

"It's amazing how TBI connections span the world and pop up when you least expect it!" said Karuppur.

Abhiram graduated from Princeton University in 2019 with a bachelor's degree in chemical & biological engineering. He is a TBI Scholar (2018) and currently serves as treasurer of the Central Jersey Alumni Chapter.



NEW YORK THETA '96

Siren R. Chudgar M.D.

Siren, a family physician with WellMed, has been honored with Clarkson University's Most Prestigious Alumni Award of the Year. He received his B.S. in civil engineering and his doctor of medicine from SUNY Upstate Medical University. He and his wife have established a scholarship at Clarkson.



NEW YORK MU '21

Amanda E. Ashmen

Amanda graduated from Union College with a computer engineering degree and is a nominee for the 2021 NCAA Woman of the Year. A multi-sport athlete, she played varsity women's soccer and captained the indoor and outdoor track & field teams. She was the 2021 All-Liberty League East Champion in the 3000-meter steeplechase.



PUERTO RICO ALPHA '83

Jose A. Caraballo Oramas

Jose has joined Kite Pharma, a Gilead company, as vice president quality systems, compliance & quality engineering. He has 25+ years of experience in the development, manufacturing, technology transfer, and launch of biopharmaceuticals from the various positions held at Abbott Laboratories and Bayer.



TEXAS ETA '71

J. Gary Rankin

Gary retired in 2020 after 50 years in the aerospace business. He worked for 43 years at NASA Johnson Space Center supporting development of spacecraft equipment for environmental control of programs including Apollo, ISS, and commercial crew. He earned his B.S. in mechanical eng'g at UT Arlington.

TRUE TALES from the TESTBENCH...

Fellow engineers: the story you are about to read is *true*. Only the *names* have been changed to protect the guilty.

Words / Art:
Krishna M. Sadasivam
krishnadraws.com



DO YOU HAVE A TRUE AND HUMOROUS TALE FROM YOUR ENGINEERING EXPERIENCE TO SHARE?

It could be featured in the next True Tales from the Test Bench! Send your submissions for consideration to dylan@tbp.org.

Brain Ticklers from page 19

Email your answers (plain text only) to any or all of the Winter Brain Ticklers to BrainTicklers@tbp.org or by postal mail to **Dylan Lane, Tau Beta Pi, P.O. Box 2697, Knoxville, TN 37901-2697.**

The method of solution is not necessary. The Computer Bonus is not graded. Where possible, exact answers are preferable to approximations. The cutoff date for entries to the Winter column is the appearance of the Spring *Bent* which typically arrives in late March (the digital distribution is several days earlier). We welcome any interesting problems that might be suitable for the column. Dylan will forward your entries to the judges who are **F.J. Tydeman, CA Δ '73; J.C. Rasbold, OH A '83; G.M. Gerken, CA H '11;** and the columnist for this issue,

— **J.R. Stribling, CA A '92**

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